Mundé (P. F.)

The Value of Electrolysis in the Treatment of Ovarian Tumors

BY

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THE VALUE OF ELECTROLYSIS IN THE TREATMENT OF OVARIAN TUMORS.

BY PAUL F. MUNDÉ, M. D.,
New York.

In December, 1875, exactly one year and a half ago, Dr. Frederic Semeleder of Mexico electrified the professional world with the thrilling announcement of "No more Ovariotomy,"[1] and by the report of several cases of ovarian tumors cured by electrolytic treatment threatened to nullify the achievements of our numerous illustrious ovariotomists. So painless and simple, so sure and effectual was, according to his account, this new method of treatment of cystic disease of the ovary, that it seemed almost criminal to have subjected so many patients to the dangerous operation of ovariotomy, which had attained its present low state of mortality only after numberless trials and sacrifices; and that many began to ask themselves whether, after all, the consummate skill and dexterity of a Spencer Wells, a Keith, an Atlee, and many others, had been all in vain, and was destined to fall into oblivion as a mere waste of thought and energy, as a relic of by-gone and darker days.

Dr. Semeleder did not profess to be the originator of this method. His attention was first called to it by two successful cases published[2] by Dr. Friedrich Fieber of Vienna, in 1874, who himself appears to have received the incentive to a trial of ovarian electrolysis from a Dresden physician, Dr. von Ehrenstein, through a patient cured by that gentleman, whose claim to priority is again contested by Dr.

[1] *Wiener Med. Presse*, 52, Dec., 1875.
[2] *Wiener Allg. Med. Zeitg.*, 1874.

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Theodore Clemens of Frankfort-on-the-Main. Fieber credits Dr. I. T. Bühring with having first mentioned the method in the year 1848.[1]

But it is not of priority that I wish to speak here. Whatever ground there is for the assertions of the various competitors will appear in the course of the following pages. The question of who first employed this mode of treatment in ovarian tumors is of very small moment in comparison with the determination of the exact merits of the method, a problem which it is my object to discuss and fathom, so far as the evidence of hitherto recorded experience permits. Hardly had Semeleder's paper reached this country and begun to excite the attention of our leading practitioners, before he himself was compelled, by the political troubles in Mexico, to make New York his abode for a time. His presence was eagerly seized upon by several of our principal ovariotomists to test the treatment with which his name had rapidly become identified. A number of cases were placed at his disposal; the subject was discussed in various medical societies, and was the one theme, for the time, of professional conversation; and other gentlemen, emboldened by the simplicity and apparent innocuousness of the applications, subjected patients with ovarian tumors, which happened to come under their care, to the treatment. All was expectation, hope, and wonder. But the fates were not propitious. The ovarian tumors of our American women (at least in New York) refused to succumb to the insinuating means to which those of their Austrian and Mexican sisters had readily yielded. Semeleder himself was not successful, and but few of the other operators reported favorable results. As rapidly as expectation had been raised, so rapidly did it fall again, and there was danger of the opposite extreme being reached, as is unfortunately so often the case with many of our new remedies and inventions. First they are proclaimed as cure-alls, and because they naturally fail to respond to all the demands of their supporters, they

[1] *Amer. Jour. Obstet.*, Oct., 1876.

are at once decried and summarily cast aside as worthless.

This method of electrolysis of ovarian tumors is too vastly important to be dropped without thorough, impartial, and painstaking consideration. Heralded as it has been with the convincing argument of three CURED cases, supplemented since by several others also cured or much relieved, it does not seem possible that the treatment can be all delusion, and it certainly does not appear right or just to discard it without a fair trial, at all events not until its successes and failures have been reviewed and some definite conclusion drawn as to its therapeutical value. This, then, is the object of this communication. I shall not enter into a discussion of the *modus operandi* of the galvanic current in cystic growths, how it produces the absorption of the fluid, whether by coagulation or decomposition of the cyst contents, or by a peculiar change in the cyst walls or influence on the nerve-elements supplying them, mysteriously called *catalysis*, or by what other occult means. Electropathologists incline to the latter view. Semeleder believes both in decomposition and absorption of the contents and the catalysic change of the cyst-wall, destroying its power to secrete further. Fieber recommends previous evacuation of the fluid, in order that a certain destructive process may be surely inaugurated in the cyst-wall, by which sooner or later the entire neoplasm is shriveled and destroyed. Ehrenstein calls the process "electro-catalysis," which Dr. Beard, of New York, informs me is, in his opinion, the proper term. So far the authorities seem unable to explain the How of the method, which inability, of course, enhances the mystery and is one of the main arguments of the skeptics, who term oöphoro-electrolysis "the medicine of the 'Arabian Nights.'" But before proceeding to the enumeration of the individual cases, I deem it necessary to a correct appreciation of the latter, to mention the method by which electrolysis may be practised in the treatment of ovarian tumors, and the procedures adopted by the different leading operators in this branch.

There are two methods of applying electrolysis: the external or percutaneous (which is really no electrolysis at all), and the internal, by means of the introduction of one or more needles into the tumor. In the percutaneous method, both poles may be placed on the abdomen at some distance apart, or one pole may be held in the hand or introduced into the vagina, while the other is changed about on the abdomen, or one on the back and the other on the abdomen. In the internal method, one or more, generally insulated, but with mild currents also non-insulated, needles are thrust into the tumor through the abdominal walls, and the other or sponge-electrode is placed on an opposite spot of the abdomen or introduced into the vagina. This latter method is theoretically and practically proved to be the more efficient, although it will be seen that some of the operators have used both procedures alternately in the same case, and several cases of cure even by the external method alone are reported.

Some practitioners have combined local and general Faradisation with the galvanolytic treatment, as they claim, with marked advantage.

The batteries used for electrolysis are either composed of zinc and carbon, or of zinc and copper elements, and must be so arranged that the positive (carbon or copper) and negative (zinc) poles must alternate. If all the zinc elements are directly connected, and all the carbon or copper elements also, more heat will be generated, but less electrolytic power.

I purposely abstain from dilating further on the minutiæ and technicalities of the electrolytic process, partly because all these points have been quite fully discussed by Drs. Semeleder and Fieber, and partly because they are foreign to the aim of this paper, not to speak of my lack of competency to handle them as an expert. I wish to confine myself here simply to facts, as near as I can determine them, and to exclude theorizing entirely.

The honor of inaugurating (or reviving) this new de-

parture in ovarian therapeutics belongs chiefly to three men, — Fieber, Semeleder, Von Ehrenstein.

Fieber, in a "report of 16,000 cases of diseases of the nervous system, thorax and larynx," [1] in 1874, published two cases of ovarian cysts cured by electrolysis, which first attracted Semeleder's attention. Subsequently Fieber [2] described the process employed by himself, which is exceedingly simple. Indeed he calls it "simple acupuncture," saying that he connects one pole with a needle (which pole he does not say, although I judge from following remarks, the negative), and the other, which is to be applied to the skin, with an ordinary sponge-electrode. He does not mention how often the applications should be made, or how long, or how strong, but says that they may be carried out in the physician's office, although he prefers the safer course of choosing the patient's residence (therefrom I judge that he used mild currents, and Semeleder so asserts). If the cyst contains a large quantity of fluid he advises that it be voided before proceeding to electrolysis, in order to ease the patient as rapidly as possible, and not to waste the current in decomposing a fluid which can much more readily be removed otherwise, but rather to confine its force directly to the cyst-walls. He also combines percutaneous electric (galvanic, I presume) applications with the electrolysis, although he does not place much reliance on them, and warns against losing time with them.

One point of importance stated by him is the different action on the tissues of the needle when it is connected with the negative or with the positive pole. With the negative pole the flesh appears cooked, the channel of the needle is smooth, and the needle is easily movable in, and can be readily removed from it. With the positive pole, however, the whole needle-channel shows a grayish-black coloration, and the needle, corroded itself, adheres quite firmly to the tissue. The advisability of connecting the

[1] *Wiener Allg. Med. Zeitg.*, 1874.

[2] *Am. Jour. Obstet.*, loc. cit.

needle with the positive pole in preference is, it seems to me, apparent when we consider how easily the fluid might ooze into the peritoneal cavity from, or, what is infinitely worse, air enter the cyst by the gaping channels of the negative needle-punctures.

Semeleder, at the time of his second communication,[1] flushed as he then was with, at least, no unfavorable and mostly favorable results, was more bold than at a later period. In five of the cases reported by him then he introduced sometimes both needles into the tumor, generally only one, and made the applications daily, lasting from five to ten minutes. The current, however, was always mild, no anesthetic was used or needed, and the patient experienced no noticeable inconvenience from the operation. He first took care to confine the punctures to a limited area, fearing that they might cause adhesions which would be very troublesome if the failure in a cure subsequently necessitated ovariotomy, but when he found that no inflammatory reaction followed the punctures, he extended them all over the tumor, and is confident that they do not produce adhesions. Polycysts he advises, with Fieber, to be punctured so as to thrust the needles through as many cysts as possible. He states that up to that time no relapse had occurred, and believes that such a one could be explained by supposing, not that the original cyst had refilled, but that a smaller cyst had escaped the needles and begun to develop. The batteries he has used are the carbon-zinc and copper-zinc, evolving the constant current only. In one case, where he feared hemorrhage, he applied both electrodes to the skin of the abdomen, or one on the abdomen and the other in the vagina; in another case the nature of the tumor was doubtful, and it was low in the pelvis, so he limited himself to percutaneous applications, after running a needle several times into the tumor. Which battery is to be used, and which pole should be introduced by needle in a particular case, as well as which class of tumors

[1] *N. Y. Med. Jour.*, June, 1876.

are most favorable to electrolytic treatment, and to what extent that treatment should and may be pushed, are all points to be determined by further experience.

In a later paper,[1] published after his return to Mexico, Dr. Semeleder gives some additional details as regards his *modus operandi* as follows: —

1. *Battery.* The battery he used was a zinc and copper (Calland), and a zinc and carbon electrolysis instrument (Leiter). Any battery so arranged as to produce electro-chemical effects will answer; it makes no difference what substances the single element is made of, but there must be several smaller elements, and the positive pole of each element must be connected with the negative pole of the next following element, so as to form a chain.

2. *Number of cells used.* His Calland battery of twelve elements decomposes in one minute .03 cubic centimeter of common water acidulated with one drop of sulphuric acid to the ounce, while Leiter's electrolytic battery of eight cells decomposes in one minute .30 cubic centimeter as measured by the voltameter. The electro-chemical power of a battery depends on the number and size of the elements, on the quality of the exciting fluid, and on the extent to which the elements are brought in contact with the fluid. But the number and size of the elements do not convey an idea of the electro-chemical power developed.

3. *Strength of the current.* As a rule, from eight to ten Calland elements. A stronger current, although satisfactorily applied by others, he considers unsafe.

4. *Length of the sittings.* Five minutes, as a rule, although fifteen minutes have been employed with benefit.

5. *Frequency of applications.* He has employed them every day, even during the menstrual period, and advises the same, unless a special contra-indication exists.

6. *Introduction of needles.* Generally he introduced only the needle connected with the positive pole, and thinks this the safest plan, as the current passes just as well through

[1] *N. Y. Med. Jour.*, March, 1877.

the liquid when only one pole is inserted, and because the negative pole gives more pain and is more likely to produce burning and sloughing.

7. *Kind of needles, insulated or not.* He thinks that the mildness of the currents renders insulation of the needles unnecessary, and uses platinum, and preferably steel needles, of the size of a knitting-needle, pointed. One needle is introduced, the other pole applied to the skin with a sponge or metallic electrode, if the latter, separated from the skin by a layer of blotting-paper soaked in salt water.

Dr. J. W. Von Ehrenstein, physician in charge of an electro-therapeutic institute in Dresden, has been placed third on the list, not because he was the last to practise the method, for indeed he claims precedence of all others in having developed the plan, but because his first two brief publications followed those of Fieber and Semeleder, and with another subsequent one contain no detailed description of the method which he styles *his own*, but merely long notes of one case, and the mere mention of a number of others claimed to have been cured thereby. Published as these two communications were in a journal having comparatively little circulation in this country outside of medical libraries, I venture to say that they have met the eyes of but few American physicians, and that the name of their author is scarcely, if at all, known on this side of the Atlantic. For this reason, and because the number of cases claimed to have been cured and benefited by him with this method far exceeds that reported by any other operator, and all operators together, do I deem it important to cite his experiences, meagre though the account be which he has thus far seen fit to give us.

In three short notes under dates of May 3, 6, and 17, 1876,[1] Dr. Von Ehrenstein claims the priority of the electric treatment of ovarian dropsy discovered by him, and states that the case which first induced Drs. Fieber and Semeleder to adopt the method had been under his care ;

[1] *Allg. Med. Central Ztng.*, 36, 37, 40, 1876.

further, that since 1871, when he discovered this treatment, *several hundred* ovarian tumors have been treated by him in this manner, nearly fifty of which were *cured* in his establishment, while all of the cases treated were materially benefited. As a reason why he has never published this great invention, he says that he had not considered the question sufficiently matured and wished to collect the necessary cases. But as the statements of the patients referred to have been used as a basis of operations by several physicians with less successful results than those obtained by Dr. Semeleder, three of the cases having terminated fatally, he thinks it incumbent upon him to publish his method and cases at an early date.

For his part he substitutes for Semeleder's peremptory "No more Ovariotomy," the modest question: "How far do our electro-therapeutical results in each individual case enable us to save the patient from the ordeal of ovariotomy?" A question which he would answer by saying, "that henceforth we possess in the science of electro-therapeutics a remedy against ovarian dropsy which by means of its extraordinary freedom from danger and pain, as well as the great probability of entire cure and the almost perfect certainty of relief from all discomforts and the impending danger to life under all circumstances, calls for a fair trial, before undertaking puncture or subjecting the patient to the chance of life or death by ovariotomy." A month later we therefore find in the same journal[1] an article entitled, "Additional Explanations and Cases from my Electric Institute, in Proof of the Efficiency and Scope of my Electric Treatment for the Radical Cure of Ovarian Cysts."

In this paper Ehrenstein says that Semeleder's announcement, "No more Ovariotomy," was evidently premature, and repeats his opinion that the method, "even after five years' experience and a successful trial in hundreds of cases," is not yet ready for judgment; he therefore begs his readers not to expect as yet a detailed account of his method,

[1] Ibid., 48, 49, 50, 51, June 14–24, 1876.

giving as an excuse the haste with which he has been compelled to appear before the public, the multitude of his other duties, and the uncertainty as to how the profession may look upon the matter ; and promises to limit himself to an exact statement of facts, without indulging in epicritical speculations, and to report both his good and bad results. Finally, he styles his procedure as "something which is to him partly a knowledge, but partly also a personal potency," ("Das, was mir zwar halb ein Wissen, halb aber auch ein persönliches Können ist"), which it is difficult to reproduce in writing, and closes this introductory explanation by the assurance that "Facta loquuntur." He goes on to explain at some length the manner in which, the diagnosis of cystovarium having been assured, the exact measurements of the abdomen are taken, an accurate control of the results of the treatment secured, and all errors as to the dimensions avoided. He marks with nitrate of silver four points on the abdominal surface of the patient, namely, the lower tip of the ensiform cartilage, the superior border of the symphysis pubis, and the right and left anterior superior spinous processes of the ileum. From each and all of these points the distance is measured to the umbilicus, both rectilinear by compasses, and curvilinear, following the convex line of the abdomen by tape-measure. Taking the average of the two measurements of each of these lines and adding them together, a sum total is obtained expressive of the exact dimensions of the abdomen, a comparison of which with the same measurements made just prior to the next sitting, accurately shows the increase or decrease of the tumor. To be sure, the greater or lesser amount of ingesta or of fecal accumulation or flatus may affect any measurement as compared to the one preceding or following it ; but this same objection applies with equal force to the ordinary measurement by tape-measure around the abdominal circumference at different points, and measurement during gastric or fecal distention is readily avoided by undertaking it only before a meal, and by securing regular defecation.

The gradual, occasionally rapid, diminution of the cystic volume under electric treatment manifested by the measurements becomes a delightful and undeniable certainty when it goes hand in hand with an often marvelous improvement in the general health and physiological life of the patient, when she, "as it were, becomes visibly rejuvenated."

When patients with enormous abdominal distention incapacitating them from walking, with icteric, muddy complexions, without appetite or strength, anemic, suffering from persistent insomnia in consequence of want of exercise and terror of the inevitably impending ovariotomy, — when such patients, soon after beginning the course of electricity feel their long-lost appetite returning, recover their normal habit of defecation, when profuse discharges of urine and perspiration occur without the action of diuretics and diaphoretics, when at his (Ehrenstein's) instance they are able to take calisthenic, and gradually out-door exercise, and thereafter enjoy a natural and refreshing sleep without the aid of hypnotics, and regain the functions of respiration and perspiration to their full extent ; then, when they fully realize all these marvelous changes, they awake to new life, and the conviction of the wonderful effects of the electrolytic method forces itself with irresistible power on the mind of patient and physician !

This improvement in general health to a great extent invalidates the information which careful weighings of the patient might afford us in estimating the decrease of the tumor, for it was found a rule that in proportion to the diminution of the tumor a corresponding increase in weight of the remainder of the body took place, which occasionally even exceeded the loss of gravity in the pathological growth. In this connection Ehrenstein mentions an objection to the ordinary method of ascertaining the weight of a body which applies to the whole system, namely, that only the absolute gravity of the patient's body is ascertained, instead of the specific gravity also, thus making a consumptive in the last

stages with anasarca weigh more than he did when the disease was still in its infancy. How to remedy this defect Ehrenstein says neither physicists nor mechanicians have been able to tell him.

Ehrenstein then briefly tabulates eight cases of cure in order to show the differences between the measurements at the beginning and conclusion of the treatment, and then relates one case *in extenso* — all of these cases I shall enumerate hereafter — giving a table of the almost daily measurements for two months, with the difference between every two measurements, until the final complete cure of the patient.

In the course of this case are interlarded remarks, the only ones I have found referring to the peculiar method claimed to be employed by him, which I, therefore, think it necessary to cite, unsatisfactory though they be.

The table shows that frequently the diminution in size obtained at one electric sitting was annulled at the next. This he considers partly evidence of the obstinacy of the affection and the difficulty of conquering it, but principally the consequence of the formation of hydrogen gas in the cyst through electric decomposition, which is soon absorbed with no other than occasional colicky symptoms, but never, with his method, can produce peritonitis or suppuration. Whatever slight pain occurred appeared chiefly on the right side during walking, and was always referable to this cause; it never prevented the patients from taking out-door exercise. Occasionally the fine needle punctures, instead of healing spontaneously as usual within twenty-four hours, became superficially inflamed, but readily yielded to an ointment of nitrate of silver.

The two signs which Ehrenstein hails as the "beginning of the end," as harbingers of approaching recovery, are, 1st, the impressibility of the abdomen, even though it still appear pretty well filled, which permits the palpating hand almost to touch the vertebral column; and, 2d, a peculiar gnawing, hungry, empty sensation in the gastric region,

a sign which he has observed only in women immediately after confinement. In both cases the sensation probably originates in the emptying of an elastic cavity, the contraction of which is but slow and imperfect.

The after treatment following the disappearance or rapid diminution of the cyst, when needed, consists in an abdominal supporter, strengthening abdominal inunctions, and chiefly in the regular employment of Faradic electricity and calisthenic exercise. With the promise of a speedy continuation in a subsequent number, this communication closes, and the peculiar method by which the author has achieved such splendid results still remains a comparative secret, for no conclusion of his paper has thus far appeared. In a note dated March 10, 1877, Dr. Von Ehrenstein informs me that his "old infirmity of blindness has been supplemented by a distressing nervous affection which nearly incapacitates him from speaking, and renders him unable to comply with the request I had made of him to supply me with the details of his method and his cases. Should the course of treatment which he was about to undergo in Vienna prove successful, he would then gladly put the fruits of his large experience at my disposal for the propagation in the New World of the electric treatment of cystovarium discovered by him."

I should have waited until receiving the rich fund of experience thus promised me in support of the method before preparing this paper, had I not thought that the signs of the times, in New York at least, called for a speedy revival of the question of oöphoro-electrolysis, to rescue it from the impending depression following Semeleder's first over-zealous panegyric and subsequent unfortunate results, provided such a rescue be indeed practicable. I have been thus explicit in detailing the paper of Von Ehrenstein, and shall be equally so in relating the one case carefully reported by him, because the marvelous results claimed by him entitle his assertions to the most marked attention, and because I believe the details of his treatment to be of the greatest importance.

I cannot but deplore his to me inexplicable hesitancy in detailing his method on the ground of its not yet having been sufficiently tried. I think the profession generally will agree with me that a method of treatment by which "several hundred ovarian tumors have been beneficially treated, and nearly fifty of them cured," is surely sufficiently mature and well founded to be placed before the profession, and that its author commits an injustice both towards himself and his method, and towards those afflicted with cystic ovarian disease, by still longer deferring the full publication of his experience.

Scarcely had Ehrenstein published his claim to the priority of the treatment in question, before Dr. Theodor Clemens of Frankfort-on-the-Main indignantly repelled the claim, and asserted [1] that he had already treated and cured ovarian tumors by electrolysis as early as 1859.[2] On looking over the various articles written by Clemens on the general subject of electro-therapeutics extending from the above date, to as recent a period as the middle of the year 1875, I find that the method then described by him as well as the results claimed by him do not justify him in asserting either his priority to the operation of galvano-electropuncture or an equal success with Von Ehrenstein.

His first communications treat principally of electro-therapeutics in general, interlarded with observations on the diminution of purely chronic hypertrophic ovaries by electricity, one electrode being placed on the abdomen, the other over the sacrum. Of the three cases there reported as cures of ovarian tumors, two are instances of this nature, and only one is a real polycyst of the ovary. And this one was not cured, as the report of the case below will show. He says that he uses Daniell's battery, eight to ten elements of which are needed before sufficient effect is produced on the tumor. The current is passed transversely through the

[1] *Allg. Med. Central Ztng.* 38, 1876.

[2] *Deutsche Klinik*, 1859, 5, 27; 1873, 48; 1874, 16, 28; 1875, 6, 7, etc.

abdomen, the zinc pole being placed on one side, the copper pole on the other. Before passing the galvanic current, the patient was generally subjected to from four to six or twelve electric shocks, sent through the tumor from a battery peculiarly the author's own. The electrodes are round metal plates 4″ in diameter covered with double layers of linen, wet in rain-water. The patient soon feels a decided sensation of warmth in the abdomen and of increasing lightness. The cystic fluid on tapping is found changed both in color and constitution, becoming dark and containing larger quantities of albumen and tissue-detritus.

The articles in 1873, and the succeeding years, treat of "electric acupuncture," but I regret again not to have been able to glean more than a few tangible points from a great mass of electro-physical speculation. Clemens uses steel (so called Carlsbad), but also copper, platinum, gold, and silver needles. The sittings last from five minutes to one hour; in cases of unipolar acupuncture he has even extended them to one hour and a half. He divides electropuncture into three varieties: unipolar, when only one needle is introduced; bipolar, when both poles are needle-armed and both are introduced; and electrolytic, when certain substances, chiefly iodine, are supposed by electrolytic action to be passed through the tumor. This last is an idea which he evidently greatly favors. He says further, that electric treatment differs according as it is employed in cystic growths or on solid tumors, the latter of which, if absorption is to be increased, secretion diminished, or the fluid decomposed (on the probability of which processes he casts a doubt by affixing a ?), evidently will not prove amenable to the treatment. His idea is, that the reducing metamorphosing influence of electricity, particularly the Faradic current, consists in the production of a commotion of atomic elements, of a peculiar oscillation or vibration of the molecules, which changes the intimate construction of the tumor and renders absorption possible.

A thrombosis, or slight inflammation (capillary embolism,

always takes place at the point of insertion of the poles) and is generally funnel-shaped, the base of the funnel being towards the surface. From these thromboses starts the process which results in the atrophy and diminution of the tumor, and is evidenced by a slight depression at each such spot.

In the journals at my disposal I was unable to find reports of any of the cases promised by him (perhaps I missed the numbers containing them ?), and I am therefore obliged to close this quotation in as unsatisfactory a manner as I did that of Von Ehrenstein. It is unfortunate that both of these gentlemen, who claim to be adepts in the science of electro-therapeutics and inventors of the electric treatment of ovarian tumors, have, in all their writings, chiefly indulged in speculations and vague, unsupported assertions, practically entirely valueless, instead of giving us definite details and directions how to follow their example and popularize their great discovery.

No more positive information do I gain from a letter from Dr. Clemens, dated June 3, 1877, in answer to one of inquiry from me. He writes: "I have not answered your letter of February 8, 1877, sooner, because up to date I was unable to obtain from electro-therapeutists, who claim to have cured ovarian tumors by electricity, any details as to method or cases. As regards my own experience and results, I have cured only two cases out of fourteen treated by me by electricity, and you will find details in my book, the fourth part of which is now in press.[1] For a collation of statistical material with the purpose of deciding on the value of this method of treatment, it would seem to me that the matter is still too new and scarcely as yet above the dignity of mere experiment. If the results thus far obtained were of value, undoubtedly more would have been published on the subject. Whether real electrolysis, or obliteration by a subacute inflammatory process induced by electric action

[1] Theodor Clemens, *Electro-therapeutical Experiences*, Frankfort. Part iv. has not yet appeared.

on the vaso-motor system, or both, is to be produced by electropuncture, is still an open question, especially as histologically entirely different tumors come to us for treatment, the diagnosis of which is by no means easy. Ordinary ovarian cysts, ovarian dropsy, occasionally remain unchanged for a long while, and not unfrequently undergo retrograde metamorphosis ; cases of spontaneous cure even are not uncommon in literature. How great must therefore be the material and how positive the diagnosis before definite conclusions can be drawn. All my experience on this subject is recorded in my work, a *résumé* of which experience I would gladly give you, did its extent warrant its being used for scientific deductions. Unfortunately this point is still far distant."

This letter seems to me to afford a, probably involuntary, *testimonium paupertatis* for the practice of oöphoro-electrolysis, which, coming from a specialist in electro-therapeutics, sounds like a confession of its worthlessness. Certainly, a method which is beset with so many uncertainties, the value of which will not be definitely assured until we are able to diagnose the histological character of each and every ovarian tumor before deciding on its treatment, and the status of which fifty accurately reported cases do not to some extent assure, is too mystical and problematical ever to gain a firm hold in therapeutics.

In striking contrast to the communications of Ehrenstein and Clemens is the one from which I am now about to quote.

All the observers whose opinions I have thus far reported were warm advocates of the method, and whatever views of it might be privately entertained or expressed, no public approval or disapproval has manifested itself until quite recently,[1] when Dr. Ultzmann, tutor in the University of Vienna, critically reviewed the subject, supported by experiments of his own, and expressed his disbelief in the efficacy of electricity for the cure of ovarian tumors. His paper

[1] *Wiener Med. Presse*, 42, 43, 44, 46, 1876.

is of such importance, and gives, I think, so clearly and truly the facts as seen from the author's eminently experimental and practical stand-point, which widely differs from that of the gentlemen already referred to, that I deem it desirable to give his arguments and deductions at some length.

Ultzmann made numerous experiments with galvano-puncture on dead bodies, and on natural and prepared sero-albuminous fluids, for the purpose of ascertaining the changes which the galvanic current thus introduced would be likely to effect in the living body, the results of which experiments I will briefly detail as follows: —

When both poles of a constant galvanic battery, armed with platinum needles, are immersed in a sero-albuminous fluid, and a strong current passed through them, a development of gas occurs at each needle, which is produced by the electrolytic decomposition of the water into hydrogen and oxygen, and is more abundant at the negative than at the positive pole, the negative pole chiefly attracting the hydrogen (or bases, alkalies), the positive pole the oxygen (or acid). A perfectly clear filtered fluid from a hydrocele will rapidly show cloudiness about the positive pole, which under the microscope is seen to consist of delicate flakes, which are easily dissolved by alkalies. This cloudiness is produced by the coagulation of the albuminates by the acids generated about the positive pole. At the negative pole no such cloudiness appears.

The same alkaline and acid reaction accompanies the introduction of the needles into organic tissues, the tissue about the negative needle being gelatinized and solidified, as by caustic potash, giving an alkaline reaction, and the needle being loose in its canal and easily removable; while at the positive pole the tissue is blackened, charred, dry, the slough much smaller than at the negative pole, and the needle adheres to the flesh.

Having thus shown the direct effects of the galvanic current on organic fluids and tissues, Ultzmann goes on to

describe the method employed by him in cystic tumors of all kinds, particularly hydrocele and ovarian cysts.

The negative pole of a constant battery of twenty-four Leclanché elements, armed either with a gold or platinum needle, is passed into the cyst and the positive pole, in the shape of a large sponge, is applied to the abdominal wall. The needle is ten to twelve centimetres long, and of the thickness of an ordinary knitting-needle. The point of the needle is three-edged and sharp. Should the abdominal wall be very thick, it is best not to risk bending the needle by forcing it through into the cyst at once, but only to introduce it as far as it will penetrate easily, then apply the current and push it into the cyst only when the peculiar chemico-galvanocaustic circle appears around the needle ; the complete introduction is then always easy. The sittings last from ten to thirty minutes, and if well borne may be repeated every day or every other day, otherwise every three or four days. The strength of the current will depend on the susceptibility of the patient, but the stronger it is used the greater will be the effect. Should it at any time be impossible to pass the needle entirely into the cyst, then even the strongest current will be ineffectual in reducing the size of the cyst.

Now, Ultzmann has found that these cysts, which are amenable to the electrolytic influence, especially hydroceles, are benefited and cured thereby often with astounding rapidity. But with ovarian cysts his experience is different, and he has come to the conclusion, that the albuminates in the contents of ovarian cysts are not capable of being so changed by electrolysis as to render them prone to absorption by the cyst wall ; neither does he believe that the secreting power of the cyst wall can be so altered by the galvanic current as to render it an absorbing membrane. The result of his observations is, that the effect of electrolysis depends chiefly on the physical and chemical character of the cystic contents in each individual case, and that only those ovarian cysts which (like hydroceles)

contain a watery sero-albuminous fluid are benefited by this treatment. Such cysts are frequently seen in young, vigorous women; they possess very thin walls, and are usually found to spring from the parovarium, that is, they are cysts of the broad ligament, the fluid of which consists of an aqueous solution of chloride of sodium and carbonate of soda, with small quantities of albumen, sulphates, and phosphates, and are known to be cured often by simple puncture. Other cysts, with slightly more albuminous, but perfectly clear fluid contents, are still benefited by electrolysis. But those cysts which enclose a thick, viscid honey-like fluid, containing a large amount of mucin paralbumen and seralbumen, are entirely inappropriate for electrolytic treatment, and scarcely diminish under the strongest currents.

In those tumors, finally, the contents of which consist of decomposed blood or pus, the fluid appearing brownish-red or greenish-red, depositing a thick sediment, and showing microscopically large quantities of blood and pus corpuscles, the electrolytic procedure is positively contra-indicated and injurious, producing at once symptoms of peritonitis which may endanger the life of the patient. Such a case is related by Ultzmann as occurring in his own practice, and will be found below.

By means of an experiment with electrolysis on the fluid of a hydrocele, Ultzmann satisfied himself that electrolysis is entirely incapable of rendering the albuminates of that fluid, which are ordinarily unable to pass through the surrounding membranes, capable of doing so; further, that neither the water nor the salts of the fluid are alone absorbed by the current, for the specific gravity and relative constitution of the fluid from the hydrocele after electrolysis was exactly the same as before the treatment, although the hydrocele had diminished to one half its size within twenty-four hours after the sitting. In short, neither the coagulated albuminates nor the water and salts of ovarian cysts with seralbuminous contents are absorbed by the

lining membrane of the cyst wall as it is, nor is the functional power of the cyst wall so changed by the influence of electrolysis as to permit of its absorbing these substances. How, then, explain the statement that certain ovarian cysts with clear, thin, seralbuminous contents are cured by this treatment? Ultzmann offers a very ingenious, and, I think, plausible explanation, the idea of which was given him during his observations of electrolysis of hydrocele. As has already been stated, the needle puncture is a gaping patent canal through which the fluid readily escapes when the needle is withdrawn. Should the outer opening now become agglutinated before the inner aperture, or be closed by adhesive plaster, as is usually done, the fluid will escape into the cellular tissue, be thence absorbed, and the hydrocele cured. The same facts apply to the electrolytic cure of ovarian cysts. The thin cystic contents escape through the gaping opening into the peritoneal cavity, and being bland and innocuous, are gradually absorbed without exciting any reaction. This outflow of the fluid is assisted by the formation of hydrogen gas in the cyst.

"We now clearly understand why electrolysis achieves its greatest triumphs in cysts with thin sero-albuminous contents; why with thick, viscid, honey-like fluid no result is obtained; and why finally with hemorrhagico-purulent contents peritonitic symptoms make their appearance.

"In the first case an absorbable serous fluid, non-irritating to the peritoneum, exudes into the peritoneal cavity — rapid success; in the second case, none of the cystic contents reach the peritoneal cavity, because their thick, viscid consistency prevents their passing through the narrow, although cauterized, puncture — no result; and finally, in the third case, a fluid no longer indifferent, but more or less irritating, flows into the peritoneal cavity, and peritonitic symptoms of greater or lesser degree result — failure."

Insulated platinum needles were never used by Ultzmann, but he believes that the punctures made by them, although

not cauterized, will still remain patent (the needles being three-edged and thick) long enough to permit the escape of a portion of fluid into the peritoneal cavity.

Ultzmann denies the statement that galvano-puncture does not produce adhesions of the cyst with the omentum or anterior abdominal wall, for in one of the cases ovariotomized by Rokitansky, Jr., which had before been electrolyzed by Benedict, extensive adhesions were found, the situation and firmness of which corresponded perfectly with the seat of the punctures and the time elapsed since the treatment ; and it would be strange if the caustic effects of electro-punctures should not be followed by adhesions, when we consider, that the latter are often found to arise in consequence of simple tapping.

But the cystic fluid is also changed by electrolysis. Ultzmann, in one case, after a long course, found abundant pus corpuscles in the fluid, which diminished gradually as the time increased since the electrolysis, appearing but in small amounts at the second tapping, after six months, and having entirely disappeared after twenty months.

Ultzmann, now assuming the above-mentioned theory to be true, very properly asks : " Is it more advantageous or advisable to treat an ovarian cyst by electrolysis, or is it better merely to tap and empty it ? " and answers it by saying that on general principles it is always desirable to preserve to the body its most precious constituents, the albuminates ; therefore, electrolysis should be preferred to tapping. But, on the other hand, the electrolytic treatment is efficacious only in sero-albuminous cysts, and is dangerous in those with less fluid contents ; it is tedious, more or less painful, and, above all, sadly uncertain as to the ultimate result, for Ultzmann claims to have seen many patients, who are dismissed apparently cured after electrolytic treatment, return with their tumors as large as ever.

The electrolytic treatment of ovarian cysts, therefore, produces no radical cure, but consists merely in a painful palliative procedure, to which tapping is for many reasons to

be preferred. A patient, who before the electrolytic course, would probably have stood an excellent chance by ovariotomy, perfected as that operation has lately been, would be scarcely likely to consent to the removal of her tumor with her whole abdomen covered with cicatricial tissue or sloughs from the caustic positive pole, or with probable adhesions of the cyst to the anterior abdominal wall or to the intestines.

In view of all these facts Ultzmann arrives at the conclusions, that 1, Electricity is not a radical cure for ovarian tumors; 2, Electrolysis is nothing but a protracted method of painful puncture, by all means inferior to simple puncture with a trocar; 3, Electrolysis is likely to do more harm than good.

Dr. George M. Beard, of New York, has very recently [1] published a few "Practical Points in the Electrolytic Treatment of Cystic and Fibroid Tumors," in the course of which remarks he says, "that the object of using electrolysis in cystic tumors is not the decomposition of the fluid constituents, but the stimulation of the secreting surface so as to prevent further secretion and aid absorption." It will be remembered that, while Semeleder strives to attain both of these objects, Ultzmann's experiments go to show that the fluid may be decomposed, it is true, but that it is thereby in no case rendered more easy of absorption, and that the galvanic current is incapable of influencing the secreting and absorbing powers of the endothelium of the cyst-wall. If Dr. Beard's purpose is practicable, then it would seem as though those tumors possessed of the greatest amount of secreting and absorbing surface, notably polycysts with numerous compartments and trabeculæ, would be most easily influenced by electrolysis, and not the thin-walled unilocular cysts, claimed by Ultzmann to be the only ones amenable to this treatment. It will remain for me to show, if possible, which opinion is borne out by the facts, so far as known.

[1] *New York Medical Record*, March, 1877.

Beard further remarks that, during electrolysis of cystic tumors, the fluid sometimes flows out of the negative needle puncture during, or directly after, the operation ; but that this discharge, and the consequent shrinkage of the tumor, is a temporary matter, unless something has been done to prevent the secreting process.

According to Beard, "a battery composed of a small number of cells of moderate size is the one required in the electrolytic treatment of solid uterine fibroid, fibro-cystic, and also ovarian tumors." The actual decomposition of tissue, the electrolysis, is really the least important fact in the rationale of the so called electrolytic treatment of this class of tumors ; the great thing is the indirect modification of nutrition through the nerves. A battery in which the chemical action goes on feebly and slowly, such as in the Daniell's cell and its modifications, which affords the stimulating action of the electricity with but slight electrolysis, must therefore present some advantages.

Under the head of comparative prognosis of the various classes of tumors by electric treatment Beard places, second, "Benign Cystics. Including 'weeping sinews,' hydrocele, and possibly, also, small ovarian tumors," etc. ; not a very enthusiastic recommendation, it would seem to me. Still, a few lines above, he says, that "ovarian tumors, if treated cautiously and judiciously, with proper apparatus, so as not to excite suppuration or cause inflammation, offer, to say the least, an encouraging field of experiment ; and the probability is, that a certain proportion of cases, if taken before too great a size is obtained, will be radically cured in this way. Generally, however, these cases are not seen early. . . . . There may have been failures in the past, where in the future there will be partial or complete successes. There need be, ordinarily, no danger in electrolyzing these cases, provided the conditions and cautions here suggested are not forgotten. In this, as in other applications of electricity, the greatest mistakes are made in overdoing the treatment, in attempting to concentrate everything in a short time, and in treating all cases alike."

With these quotations I have exhausted the modern literature on the subject, so far as I am able to learn. In order, now, to arrive at a positive conclusion as to the curative value of the electrolytic treatment of ovarian tumors, — if such a conclusion, *pro* or *con*, be indeed possible at this period with the unfortunate lack of detail in the communications of the man whose experience, the largest on record, I have above quoted, — I have thought it best to place the question entirely on its merits by collecting and reporting all the cases in which the method has been intelligently and fairly tried by reliable and competent observers. These cases I have subdivided into five classes, namely, —

A. Cases in which a complete cure was obtained.

B. Cases in which decided and permanent improvement only was observed.

C. Cases in which the improvement was only temporary.

D. Cases in which electrolysis produced no perceptible effect whatever on the tumor.

E. Cases in which decided injurious results accompanied or followed the electrolytic treatment.

(*a*) Peritonitis, or other unpleasant symptoms, ending in recovery.

(*b*) Peritonitis terminating fatally.

A comparison of the number of cases in each of these five classes, with a consideration of their individual peculiarities, will, I think, give us, at least, some definite idea of the present position of the question.

These cases comprise all which I have been able to collect either from the periodical literature or through the kindness of members of the profession, to whom I made known my intention personally or through the columns of the "New York Medical Record." To those gentlemen who kindly forwarded to me their unpublished cases for unrestricted use in this paper, and to all who have aided me in my labors, I herewith express my sincere thanks.

The unpublished cases are reported in detail as given me by their authors; those already printed elsewhere have been abbreviated as much as practicable.

A. Cases in which a Complete Cure was obtained.

Case I. E. Cutter, Cambridge. — *Bilocular cyst, thin walls; one insulated needle at three sittings; treatment continued by daily external galvanization alone. No sign of tumor to be detected after two months' treatment.* (Unpublished.)

Miss L., 34 years, enlargement first noticed ten months ago. Suffers from dyspepsia, vaginismus, and abdominal pains. Nervous temperament; weak constitution. Dysmenorrhea. Large fluctuating tumor extending to ensiform cartilage; distinct wave. Aspiration produced a greenish, sticky liquid, of saltish taste, showing, under the microscope, the granules of Gluge and Drysdale, epithelium and fat. Diagnosis unquestionable.

February 15, 1877. Insulated needle with negative pole; positive pole with zinc button on abdomen; ten cells for three minutes. Cutter battery excited with strong cider vinegar.

February 18. Measured thirty inches around most prominent part of abdomen. Sitting as before, four minutes.

February 21. Circumference 29″. Can stand up straight, which she had not been able to do before. Abdomen wrinkled. Tympanites over upper part of tumor. Battery seven minutes, as before. Little pain. The battery was left with her with instructions to use it two hours every day by the percutaneous method, that is, simple application of two copper quadrangular electrodes to the abdomen. This was continued throughout the case.

February 24. Found her quite sore; painful to cough over a circular area of 1½″ radius with the site of the puncture as a centre, but no objective signs of inflammation. Abdomen enlarged to 30″. It was decided to desist from acupuncture, and to rely upon the cutaneous method alone. This was done till March 10, when it was replaced by a Hall's French C. and Z. battery with in-

duced current, which decomposed water. Measured 29½″. Tension less.

March 21. Measured 30. Abdomen distended and tympanitic. Great gastric disturbance. As a relief to the patient's fancy, as much as for real necessity, an aspirated needle was introduced, and less than one pint of greenish fluid withdrawn, which was slightly flocculent. From the difficulty in finding a distinct area of dullness, and from the general tympanites and the small amount of fluid withdrawn, it was inferred that the great abdominal distention was due to tympanites, and that the cyst really was much diminished. Extract of malt, pepsin, bismuth, and strychnia, chlorodyne. Faradisation continued, one to three hours daily.

March 27. Much better, appetite improved; measures 28″. Much tympanitic percussion, small area of dullness, slight wave impulse.

April 2. Circumference 28″. Form erect. Abdomen tympanitic throughout; no wave nor globar tumor to be felt nor detected.

April 6. Circumference 27″. General health improving rapidly.

April 13. Absolutely no sign of tumor to be detected; no wave, no dullness, no globar mass, only still slight increase in size of abdomen. Vaginismus gone, menstruation normal.

May 7. Has come down to normal size; abdomen tympanitic throughout. Danced at May-day festival twice.

Case II. E. Cutter, Cambridge, Mass. — *Large unilocular cyst. Two sittings, four and two needles, once thirty and once thirteen cells. Oozing from aspirated puncture, slight inflammation around that puncture. Almost entire disappearance of cyst.*

Mrs. S., 24 years of age, nullipara, colored. Duration of present illness four years. Enormous symmetrical enlargement of abdomen, measuring over umbilicus and crests of ilia fifty-eight inches. Great weight and distention.

The diagnosis of ovarian disease was concurred in by the physicians named in the preceding case. General health good.

November 12, 1876. Aspiration of one pint of turbid fluid resembling urine, taste saltish, of ropy adhesive consistency. The microscope showed fat globules, granular ovarian cells of Drysdale, compound granular gorged cells of Gluge, and epithelium. Heat and nitric acid showed an abundance of albumen. When acted upon by ten cells of a galvanic battery, the cystic fluid showed no signs of filamentous coagulation, but the needles were simply coated with whitish-looking gas-bubbles.

First application of electrolysis; Fleming and Talbot's carbon-zinc battery, plates $3'' \times \frac{3}{4}''$. Thirty cells were used, and four needles passed into the tumor, and the current sent through for five minutes. Two needles were introduced in the left and two in the right side. One of the needles was the aspirator needle, the smallest of the set, nickel-plated. No reaction.

November 14. Second and last operation. The abdomen shining, wrinkled, and lessened in size. The puncture made by the aspirator needle has continuously oozed since the operation. Judging from the absence of tenderness over the abdomen and the diminished size and mobility of the tumor, it appeared that the fluid had not discharged into the peritoneal cavity. It could not be decided whether the diminution was entirely due to the oozing. The punctures made by the three insulated needles were all completely healed and of course did not ooze. This point is worthy of note and remembrance. Two needles, one on each side; more sensitiveness to the puncture than the first time. The full power of the battery, thirty cells, was connected but instantly broken, as it was too painful. The current was commenced at one cell and gradually increased to thirteen, which seemed to be the limit of tolerance. Current passed five minutes. She walked home, as before, with ease.

November 18. The aspirated opening ceased to ooze.

November 25. This closure was followed by a chill, fever, accelerated pulse with circumscribed tenderness, swelling and hardening about the aspirator puncture. Opiates and rest for three days relieved these symptoms and her present condition is as follows: Feels as well as ever; abdomen puckered, like elephantiasis; curiously wrinkled appearance around the puncture, with depression at the site of each hair. A great deal of the pendulous abdomen is fat in the areolar tissue. The cyst could be felt underneath the adipose to the right of the navel; it was globar in shape and apparently 6″ in diameter. Measure, 42,″ against 58″ thirteen days before.

November 28. At aspirator puncture, formation of an abscess which discharged about one pint of pus. No cyst now discernible.

December 6. Absolutely no sign of ovarian cyst.

December 13 and 21. Adipose diminished. In dorsal decubitus hardish, rounded, mass, 3″ in diameter, palpable to the right of the umbilicus.

January 19, 1877. Tumor somewhat larger.

February 8. Tumor hard, inelastic, apparently six inches in diameter. Gives no trouble.

February 20. Gone to service as cook. Tumor not fluctuating; no pain. Health good; feels entirely relieved.

Case III. Von Ehrenstein, Dresden. — *Multilocular cyst, fluid contents; forty-three sittings in two months. Complete and permanent cure.*[1]

Mrs. K., of B., admitted to Ehrenstein's electric establishment July 23, 1873; discharged cured, September 27 of the same year. Multilocular ovarian cyst with considerable free ascites. No particular history, except certainty of long existence of tumor, which formerly increased gradually. It protruded chiefly on the left side, and was increasing so rapidly within the year as to jeopardize digestion, respiration, and abdominal circulation. Solid masses or adhesions were

[1] *Allg. Med. Central Zeitg.*, 1876.

not discernible. The sittings began July 24th, and were continued without interruption till her discharge, six applications being made in July, eighteen in August, and nineteen in September. The movements of the abdomen frequently showed a temporary increase in volume after the sittings, which Ehrenstein attributes to the electric formation of hydrogen in the cyst; but also a steady diminution of the tumor. Occasionally colicky pains, chiefly on the right side, were experienced, doubtless due to the same cause, but there was never the least sign of peritonitis. A few of the needle punctures became locally inflamed, but were readily cured by an ointment of nitrate of silver. After the third sitting an unaccountable profuse diuresis took place accompanied by a marked decrease of the abdomen. No cystic fluid escaped through the abdominal walls at any time, but the originally tense abdominal parietes became lax, after the third day, particularly in their upper portion, so as to render the formerly hidden points of the false ribs easily palpable, and a splashing motion became perceptible in the abdomen at each movement of the patient. These attacks of profuse micturition were repeated during the whole month of August, at intervals of twelve hours to three days, without, however, producing debility, because the development of a strong appetite rendered the patient better able to bear the drain on her system and the improved condition of the blood prevented the rapid refilling of the cyst by transudation of its watery constituents. The usual diaphoretic tendency did not appear in this case, but on August 29, an intense itching of the abdominal epidermis showed itself, unaccompanied by an eruption, or by a change of temperature or color. But the dry hand or a dry warm plate of glass applied to the skin at once demonstrated the presence of a continuous, almost imperceptible, moisture, which was neither actual perspiration, nor transudation from a puncture, and could be looked upon as nothing else than so called "perspiratio insensibilis." The beneficial diuresis in the meanwhile

having ceased, Ehrenstein restored it by a mixture of squills, digitalis, and oil of juniper. Soon the first signs of approaching recovery presented themselves, namely, (1) even with a still quite distended abdomen, a distinct compressibility of its walls, which permitted the hand to bury itself in its folds and penetrate even to the vertebral column ; and (2), a peculiar sensation of emptiness, gnawing, similar to that of hunger, experienced in the abdomen ; both of these signs produced no doubt by the evacuation of the elastic cavity, the cyst. The Faradic current was now substituted for the constant ; the gastric pains soon subsided ; the tumor diminished in the two weeks from September 13, to 27, from 66.75 centimeters to 58.25 cm., whilst the whole time from July 24 to September 13 had been required to reduce it from 75.25 cm. to 66.75 cm., the electric treatment being the same. September 27, patient was discharged completely cured, has since married, and up to date of report (June 24, 1876), had continued perfectly well.

Cases.	Name.	Dimensions of Abdomen in Centimeters.		Percentage of Decrease in Volume.	Percentage of Change in Weight of Body.	Remarks.
		On Admission.	At Discharge.			
IV.	Miss M., of H., North Germany	178.62	89.75	49.67	30.75	Complicated with rheumatism.
V.	Mrs. L., of Ch. . . .	110.75	60.75	45.15	1.53	Confined of a healthy girl fourteen months after cure.
VI.	Mrs. V., of D. . . .	90.00	60.75	32.50	1.83	Two years after cure also confined of a girl.
VII.	Mrs. V. H., from Russia	79.75	56.37	29.32	11.80	– –
VIII.	Mrs. T., from Russia .	127.12	87.50	–	–	70 1-4 years of age.
IX.	Mrs. K., of B., in M. .	75.25	58.25	22.59	8.04	– –
X.	Miss K., of P., in M. .	109.75	87.75	20.04	–	Complicated by mitral insufficiency.
XI.	Miss B., of D. . . .	77.25	63.75	17.49	9.29	– –

Ehrenstein offers to request permission of these ladies to give their addresses to any physician desirous to make inquiries as to the correctness of the above.

Case XII. F. Fieber, Vienna. — *Multilocular cyst, non-fluid contents; numerous sittings; reduced to size of small apple; considered cured.*[1]

Patient 32 years of age; tumor of the size of an adult head, irregular, nodular, extending half an inch above the umbilicus. Prof. Carl Braun confirmed the diagnosis of a multilocular ovarian cyst, with non-fluid contents, the extirpation of which he considered impracticable. Electrolysis was performed by Professor Braun himself the first time, then a number of times by Fieber. Reaction very moderate. The points of insertion of the needles were changed constantly, and finally extended all over the surface of the tumor. The tumor was finally reduced to the size of a small apple, a fact corroborated by one of the assistants of Professor Braun, who had seen the tumor in its original size. Patient subsequently married ten years ago.

Case XIII. F. Fieber. — *Large cystic tumor; permanent recovery.*[2]

Lady sent by Professor Braun; a cystic tumor of the ovary existing for years, considerably larger than an adult head, was completely removed by electrolysis, the last puncture having been made a year previous to the reporting of the case. The tumor as such had entirely disappeared, leaving only a funicular remnant, and some dullness on percussion. Further particulars are not given.

Case XIV. F. Semeleder, Mexico. — *Large cyst, thin walls. Five months treatment, almost daily. Complete cure.*

Young lady, unmarried, 18 years of age; tumor noticed for several years; latterly rapid increase. Tumor reached three centimeters above the umbilicus, dull on percussion; walls of tumor apparently thin, but it was very tense, fluctuation therefore not perceptible. Circumference 2″ below umbilicus, 96 centimeters. Treatment commenced April 29, 1875, and continued nearly daily, even during menstruation, to July 26. Then the abdomen measured 92 centimeters

[1] *Wiener Med. Presse*, 1874.
[2] *Wiener Med. Presse*, 1874.

"The treatment was continued in Puebla, and over two months more were required to make the cure complete."

CASE XV. F. SEMELEDER. — *Unilocular cyst; reduced to the size of an orange in six weeks. Perfect recovery.*

Married lady, 24 years of age, two children; for two years past had noticed tumor in left side of abdomen. When first seen tumor was of the size of the head of a child ten years of age, and quite soft. The diagnosis of ovarian cyst had been made and confirmed by several physicians. Treatment was commenced May 27, 1875, and continued till July 5, when the tumor was reduced to the size of an orange, and perfectly hard, and the patient returned home perfectly well.

CASE XVI. F. SEMELEDER. — *Large, probably multilocular tumor; so much reduced after six weeks' daily treatment as to render continuance of treatment unnecessary. Dimensions not stated.*

Patient 40 years. Cyst of left ovary extending to the ribs on the left, to the umbilicus on the right side; quite soft. Length of time of growth could not be ascertained. After daily treatment for six weeks the tumor was so much reduced that it seemed unnecessary to continue it.

CASE XVII. F. SEMELEDER. — *Thin-walled, probably unilocular cyst; eight weeks' treatment; cyst so shrunken as to be no longer recognizable.*

Patient 38 years, married; soft, fluctuating tumor accidentally discovered on the left side of the abdomen, extending to within two fingers' breadth of the umbilicus. Walls thin. Eight weeks' treatment during summer, 1875; cyst reduced to a small solid mass not recognizable as the remains of an ovarian cyst.

CASE XVIII. F. SEMELEDER. — *Cyst with thick walls, and contents; size of large cocoanut. Reduced to size of an egg, solid, after four weeks' treatment. Complete cure.*

Patient 45 years, one child twenty-four years before. Nervous hysterical temperament. In November, 1875, a tumor of the size of a cocoanut was discovered occupying

the left side of the abdomen, quite low down. It had a dense feel, with obscure fluctuation. Diagnosis not quite certain, but the impression was that it was an ovarian cyst, with thick walls and thickish contents. Although the diagnosis was uncertain, by express desire of the patient, electrolytic treatment was commenced, which up to Dr. Semeleder's departure from Mexico, had produced no results. The treatment was continued by Dr. Schmidtlein, who in May, 1876, reported to Dr. Semeleder that the liquid had been completely absorbed, and the cyst reduced to a hard lump of the size of an egg. Time of treatment four weeks.

CASE XIX. DR. PLYM S. HAYES, Chicago. — *Multilocular sero-cystic tumor. Four sittings; once, two needles, three times only one needle, always negative. General galvanization. Disappearance of left lobe of cyst in six weeks; accidental rupture of right lobe. Complete disappearance of both lobes. Cure.*[1] *Sequel: Return of tumor, or new tumor, two years later. Disputed points. Ovariotomy; small, solid tumor found. Death.*

Miss S., a medical practitioner, aged 40. Tumor first noticed about December 1, 1873; the patient can trace three distinct lobes. General health formerly good, but failing since discovery of tumor, which then was of the size of an orange.

March 11, 1874. The abdomen was as large as that of a woman five months pregnant, the tumor extending $1\frac{1}{2}''$ above the umbilicus, the three lobes distinctly palpable. For two weeks prior to this the patient had used the electro-thermal bath and the Faradic current had been passed through the tumor frequently, a treatment by which the general health of the patient was improved, and the tumor somewhat diminished in size.

March 13. Electro-puncture commenced, Dr. A. Reeves Jackson introducing the needles, one of which was insulated, the other non-insulated, and both connected with the negative pole; the insulated needle was passed into the

[1] *Chicago Med. Jour.*, September, 1874.

right, the non-insulated into the left cyst. The positive electrode, a moist sponge, was placed over the right sacro-iliac articulation. The current of twenty-one Hill elements (with a galvanometer and rheostat in an accessory circuit, with a resistance of 2,100 B. A. units, and that of the galvanometer coil in this circuit) was applied for three minutes, and the nine elements added, and the whole thirty given for twelve minutes longer. The skin became whitened and raised around the uninsulated needle, but remained unchanged around the insulated one. A few drops of clear, serous fluid exuded on the withdrawal of the insulated needle. For two days and three nights following the operation there was marked diuresis and diaphoresis; no pain.

March 14. Electrical treatment; feet in warm water in which positive electrode was placed, while the negative sponge electrode was applied over the abdomen for five minutes with a current of twenty-one elements. Then the negative was placed in the foot-bath, and the positive held in the hands for ten minutes. This treatment was repeated on the following afternoon.

March 21. Since March 16 she is able to dispense with the lunch between her regular meals made necessary by the former rapid growth of the tumor. Left the city for three days.

March 23. One insulated needle in right cyst, thirty elements for twelve minutes. Again marked diuresis and diaphoresis for two days.

April 9. Insulated needle into left cyst, thirty elements, fifteen minutes. No diuresis, but gentle perspiration for some time.

April 18. Fourth and last operation. Insulated needle into right cyst, thirty elements, fifteen minutes. Distinct fluctuation in right lobe, left lobe scarcely distinguishable.

April 24. Has just ceased menstruating; tumor appears as large as before last operation.

April 26. The tumor has diminished much in size.

April 29. Examination by Dr. Jackson: "The left cyst could not be found." While using considerable force in trying to ascertain size and position of the much-diminished right cyst, it was ruptured with an audible sound. Following the rupture there was dullness of percussion at the most dependent portion of the abdomen. No systemic disturbance followed the rupture.

May 1. More urine voided during the last two days than usual. No tumor to be detected, but the ovary somewhat enlarged.

June 20. No tumor; right ovary displaced to the left and somewhat enlarged; no fluctuation and whole abdomen tympanitic. Menstruation regular, general health excellent. The electro-thermal bath was used during the intervals between the operations as a constitutional tonic.

July 21. No cysts to be found when examined by Dr. Jackson.

Dr. Hayes concludes: "We consider that the operation is attended with no more danger than is the introduction of the needle of an aspirator."

There is, however, a sequel to this case, one account of which I find in a small work by Dr. Justin Hayes, entitled "The Electro-Thermal Bath," Chicago, 1877, p. 88, *seq.*

March 31, 1876, nearly two years after the cure above reported, the patient again presented herself with a new enlargement of the abdomen. This Dr. Hayes diagnosed as free ascites, not being able to detect the least sign of a tumor. The electro-thermal bath and diuretics taken for two months produced no appreciable change; on the contrary, she then began rapidly to increase. Several other physicians saw the case and detected a sero-cystic ovarian tumor, which diagnosis was confirmed by the microscopic examination of the fluid by a competent microscopist, who found ovarian cells in the fluid. This proof, generally considered tolerably conclusive of the presence of an ovarian cyst, did not convince Dr. Hayes of the incorrectness of his diagnosis of simple ascites, for he explained the presence of

the corpuscles by assuming that they escaped into the abdominal cavity when the galvano-puncture was used, or when the small cyst burst, or at a later period from some relic of the old cyst. In this view the patient is said to have coincided. Notwithstanding, the diagnosis of ovarian tumor was persisted in, and a radical operation proposed and accepted. As Dr. Hayes puts it, "The result was a formidable operation for ascites, without finding an ovarian cyst; also cauterization of the right ovary, and the removal of the left ovary, which measured when spread out on paper and outlined 1¾″ by 2½″, and showed marks of disease." The patient died December 6, eleven days after the operation, and before her death demanded an autopsy, which revealed extensive wasting of the omentum, and inflammation of the peritoneum, also fatty degeneration of the kidneys.

Nothing is said of the finding at the autopsy of relics of the multilocular ovarian tumor supposed to have been cured, of which one would expect to see traces, nor is a reason given for the rather unusual proceeding of cauterizing and returning the right ovary. That there are two sides to this question, and that the reproach of an error in diagnosis made against the physicians last in charge of the case is unfounded, would appear from the following letters from these gentlemen, and from Dr. Wm. H. Byford, of Chicago, to whose kindness I owe what seem to be the facts in the case. As the case has been repeatedly quoted as an instance of cure by electrolysis, and thus fraudulent capital unintentionally made for that treatment, I think it important to publish these letters *verbatim*, finding it impracticable to give their full import by abstracts.

OTTAWA, ILLINOIS, *May* 28, 1877.

PROF. WM. H. BYFORD, —

Dear Doctor, — By request of Dr. John E. Owens, of Chicago, I write you to give you our reasons why we diagnosed Miss P. A. S.'s case, one of ovarian tumor. For a more minute history in the earlier stages of her case I refer

you to the "Chicago Medical Journal," of September, 1874, where you will find a report of the case as made by Dr. P. S. Hayes of your city. You will please note that some of the details I do not report as he does ; he may be right and I wrong. I depend upon what Miss Shotwell told me at a time more distant from the inception of her disease than his report, therefore I say he would be more likely to be right than her report to me ; still I report it as it came to me.

Miss P. A. S., by profession a physician, her age would have been forty-three on January 4th, 1877. On the morning of December 1, 1873, before rising, she discovered in the lower part of the left lumbar region a tumor the size of a fist. Her menstruation commenced between the years of thirteen and fourteen, and continued regular up to the time of the discovery of the tumor. She had been troubled with leucorrhea more or less for the preceding fourteen years. From the 1st of December, 1873, to about the middle of February, 1874, she watched the steady growth of the tumor, at which time (middle of February, 1874) she went to Chicago, and placed herself under the care of Dr. Hayes. She remained under his charge until the following August, when she returned to her home, and again resumed the practice of her profession, thinking at that time that she was quite well. For the treatment as reported by Dr. Hayes, see "Chicago Medical Journal" of September, 1874. On the 1st of April, 1876, she again returned to Chicago, and consulted Dr. Hayes, and was treated by him until about the 1st of June. Miss Shotwell called on me about the middle of June ; at that time I did not examine her. Some ten days later Dr. R. F. Dyer, of our city, examined her and pronounced her disease an ovarian tumor. On the same day that she was examined by Dr. Dyer, Dr. James H. Campfield of our city also examined her, who agreed with Dr. Dyer that she had an ovarian tumor. About the 1st of July I called on Miss Shotwell at her home, not then being aware that Drs. Dyer and Campfield had examined her. I first

examined her sitting up; found increased size about waist, six and a half inches more than her ordinary measurement when well. The tumor at this time rose about two inches above the umbilicus, and measured nearly one inch more at umbilicus on the left side than on the right, that is to say, measuring from the spinous process of the vertebra on a level with the umbilicus to the linea alba. I found as above stated that the left side was one inch larger than the right side; and the tumor thus far more on the left than right side. While in this position percussion gave a dull sound all over the region of the tumor, and resonant sound around its borders. There was no tenderness of the abdomen at this time, and the abdominal walls glided freely over the tumor. She was but little emaciated, and showed no constitutional symptoms. Her catamenia had been regular, yet she thought, perhaps not quite so profuse as in times past. I now examined her lying down (and here let me say that up to this time she did not believe her trouble was ovarian), and found the dullness in the same place whether she turned to the left or right side, or lying on her back; there may have been a little change of area of dullness when she changed her position, but slight; percussion now gave the wave, clear and distinct throughout the tumor, yet to get fluctuation clearly you had to press with some force on the abdominal walls to reach the cyst on her right side from the wave passing all through the tumor. I diagnosed a uniocular tumor springing from the left ovary. The patient grew rapidly from this time until the twentieth day of August, when in company with Dr. Dyer we tapped her. In tapping we used a rather small needle of an aspirator, and through this drew thirteen pounds of a straw-colored fluid, which, upon being heated, formed a solid coagulum of a grayish-white color. The patient was tapped lying on her right side. Dr. Dyer passed the trocar through the abdominal walls after first making an incision through the skin. After passing the trocar through the walls there seemed to be a stratum of fluid, but pushing the trocar a little further,

he came in contact with the tumor, pierced it, and drew off the contents until he had taken away the above thirteen pounds. I held the trocar in position while he pumped the fluid away, and I observed the tumor contracting as he proceeded to draw the fluid, until all at once the point of the trocar slipped out of the tumor, partly owing to the tumor shrinking away from the trocar, and partly to a slight retraction of the trocar. The trocar still remained within the abdomen. We discussed the question whether we should again thrust the trocar through the walls of the tumor, and withdraw more of the fluid, as there was a good deal left. The patient complained that she was somewhat exhausted, so we concluded to desist from further attempts at this time. I am more particular about the details of this tapping, as settling the question, whether there was a cyst at this time, as at the operation for a radical cure we found no cyst enclosing the fluid. About four ounces of this fluid were sent to Dr. John E. Owens, of Chicago, and submitted by him to Dr. Danforth for examination, who made a microscopical examination, and diagnosed ovarian tumor. After tapping, the patient gained in flesh, and was in good spirits. We found in about two weeks her size to be again slowly increasing, which continued until the 24th day of November, the day of the operation for a radical cure. I enclose Dr. Dyer's note to me, in answer to a note I addressed him, asking him why he pronounced Miss P. A. Shotwell's case a cystic ovarian tumor. I have this moment received a letter from Dr. Owens, in which he makes some extracts from a book published by Dr. Hayes. I shall take occasion to answer said book in detail. I am, dear sir, Your most obedient servant,

J. C. HATHEWAY.

DR. J. C. HATHEWAY :—

Dear Sir, — You ask me to state why I pronounced Miss P. A. Shotwell's case one of cystic ovarian tumor. In June, 1877, I was called to examine her. I first di-

rected her to urinate, then placed her in a complete horizontal position. I first observed a prominence of the abdomen, which, upon percussion, gave a dull sound. Then by a bimanual examination I could clasp a tumor and move it; then by turning patient on side but little change of bowels took place; then by a vaginal examination with right hand, with the left applied externally, I could feel a tumor about the size of a child's head (somewhat larger); and as there was a distinct fluctuation, and no history of heart, liver, or kidney disease, no cancerous cachexia, I had no hesitancy in pronouncing the case one of cystic ovarian disease. There were other symptoms, which I have not enumerated here, that assisted me in making my diagnosis.

I am, truly yours, R. F. DYER.

OTTAWA, *May* 28, 1877.

117 TWENTY-FIRST STREET, CHICAGO, *May* 19, 1877.

WM. H. BYFORD, M. D.: —

My dear Doctor, — According to promise I send you the chief points in the Shotwell case. The earlier history of the case will be found in the "Chicago Medical Journal," September, 1874. The patient, on the morning of December 1, 1873, discovered in left lumbar region a tumor the size of the fist; menstruation was regular to date of discovery of the tumor, which steadily enlarged till the middle of February, 1874, when she placed herself under the care of Dr. P. S. Hayes, of this city, and remained under his care until the following August. Under the impression that she was well she returned to her home, and resumed the practice of her profession. In April, 1876, she returned to Chicago, and was again treated by Dr. Hayes until June 1st. About June 10th she was examined by Dr. Dyer, of Ottawa, who diagnosed ovarian tumor. Dr. Hatheway, of the same city, who was at the time not aware that Dr. Dyer had examined the case, called upon the patient about July 1st, and discovered a tumor, the superior limit of which was on a line two inches above the umbilicus; the abdominal walls glided freely over

the tumor; the tumor enlarged rapidly until August 20, when she was tapped, thirteen pounds being withdrawn. Dr. Hatheway, in charge of the case, observed the tumor diminishing as the fluid was withdrawn, until suddenly the point of the trocar slipped out of the tumor. There was a free discharge of fluid during the subsequent twenty-four hours. Three or four ounces of fluid were sent to me for examination. I submitted it to Dr. I. N. Danforth, who furnished the annexed report. After the tapping the patient gained in flesh and spirits, but in two weeks she again found that she was slowly filling up as before, and so continued to fill until November 24, 1876, the day that I performed ovariotomy upon her. Menstruation had been quite regular, though somewhat more scanty, during the last few months. On November 27, assisted by Drs. Hatheway, Campfield, Stout, and Dyer, I removed the tumor. The patient died December 6, of peritonitis. Upon opening the abdomen (at the time of the operation) a large quantity of serous fluid was poured out from the cavity of the abdomen; no tumor was at this moment discovered; the incision through the abdominal walls was four inches long. I soon began a search for the ovaries. The right was first found rough and firm; well down behind the uterus was a fibro-cystic mass attached by a pedicle. This mass was the degenerated left ovary. The parietal peritoneum, at the time of the operation, was red, thickened and velvety. Recent lymph was removed from its surface in two localities.

Respectfully yours, JNO. E. OWENS.

CHICAGO, *May* 26, 1877.

PROF. J. E. OWENS, M. D.: —

My dear Doctor, — With reference to the specimen of fluid purporting to be ovarian which you sent me for examination a long time since, I have to say that I quite distinctly remember finding the "gorged granules" or large granular corpuscles described by Eichwald, Drysdale, and others, and generally regarded as diagnostic of ovarian dis-

ease. I reported to you at the time that if the presence of these peculiar cells was proof of the existence of an ovarian cyst, then the case in question could be nothing else.

Yours, etc., I. N. DANFORTH.

125 STATE ST., CHICAGO, *June* 4, 1877.

DR. PAUL F. MUNDÉ: —

Dear Doctor, — While in Boston I mailed to your address the papers of the gentlemen who had charge of Dr. Hayes' patient with ovarian tumor. I have every confidence in their capacity as observers, and veracity as physicians. I saw the tumor removed by Dr. Owens. It was about three inches in diameter, quite solid in consistence, containing several sacs from the size of a walnut to that of a shot. There was another, empty of its contents, and with an opening that would admit two fingers. The edges of the opening in the empty sac were thin, as though the orifice had existed for some time before the operation. The empty cyst would have contained an ounce of fluid.

This, so far as I can judge, is about all the information, in addition to the papers I sent you, essential to your understanding of the sequel to the case.

I am, as ever, yours, etc., W. H. BYFORD.

It will thus be seen conclusively that there certainly was an ovarian tumor present in August, 1876, two years after the reported cure, when the patient was tapped, the walls of which tumor were shrunken and collapsed when the abdomen was opened three months later. Whether this cyst was simply a refilling of the one claimed by Dr. Hayes to have been cured by electrolysis, or whether it was an entirely new cyst developed since the cure of the original tumor, can scarcely be determined. The shadow of doubt thrown on the result of this case by these conflicting statements to a great extent invalidates its use as an instance of cure by electrolysis. A permanent cure it certainly was not. Having, however, been published as such, I leave it in this

category, where I had placed it before the sequel became known to me.

Case XX. Dr. R. W. Macdonnell, Montreal, Can. — *Two applications; gradual disappearance of tumor; entire cure, confirmed nine months later.* (Unpublished.)

Circumference of abdomen thirty-four inches; after two applications it had diminished to twenty-eight and a half inches. The operation was performed on August 29, 1876, first by application of sponges alone, the next day by one sponge and one needle. A Daniell's battery of six cells was used. The patient was seen a short time ago, and no trace of the tumor could be detected.

I am indebted for these brief notes to Dr. Macdonnell himself, who proposes to publish the case *in extenso* hereafter.

Case XXI. Dr. J. T. Everett, Sterling, Ill. — *Three sittings; twenty cells; one negative needle. Complete cure. No trace of tumor found three years later.* (Unpublished.)

Mrs. A. M., seen September 3, 1872, aged 32. Multipara, anemic, strong specific symptoms. Detected cyst of right ovary of three years' growth. Circumference at hips 36″, umbilicus 42″, ensiform cartilage 32″.

Three insulated silver needles were introduced six inches into the cyst, and attached to the negative pole of a twenty-cell zinc and copper battery; the positive pole was placed over the sacro-lumbar articulation, and the current passed through for five minutes.

September 8. Umbilical diameter 36″. Treatment repeated.

September 15. Umbilical diameter 28″. Treatment repeated. From this time the patient gradually regained her normal health, and was lost sight of for three years, when she was again examined, and no trace of the tumor found.

Case XXII. J. T. Everett. — *Medium sized tumor; fifteen sittings, thirty cells, one needle, once a week. Entire disappearance of tumor.* (Unpublished.)

May 10, 1873, saw Mrs. F. H., aged 26; good general health. Found ovarian tumor involving the left ovary, of the size of an adult head. A silver needle was introduced 4″ into the sac, and a twenty-cell current passed through it for five minutes, as in the preceding case. These sittings were repeated once a week until fifteen had been given, when the tumor had entirely disappeared. It has never returned; the patient has since given birth to a child, and is now in perfect health.

CASE XXIII. J. T. EVERETT. — *Very large tumor; three platinum needles to negative pole; only two sittings on the same day, of together fifty minutes; thirty cells. Rapid decrease of tumor; entire disappearance in a year.* (Unpublished.)

Mrs. S. W., aged 42; multipara, formerly of robust health, but now presenting the facial cachexia common to ovarian tumors. She had noticed the growth for four years. December 8, 1873, umbilical circumference 49″. Inserted three platinum needles seven inches into the cyst, and passed a thirty-cell current, the same as in the two previous cases, for twenty minutes. The patient was then allowed to rest one hour, and then the doctor having to return to the city, the current was again given for thirty minutes more. The patient made a rapid improvement; the tumor decreased until the umbilical diameter reached 30″, and the general health improved exceedingly. The doctor was informed that at the expiration of one year the enlargement had entirely disappeared.

CASE XXIV. DR. ST. CLAIR, of Rossville, Staten Island, has cured a case of ovarian tumor by electrolysis, so I am informed, but his absence on a prolonged journey, for his health, has prevented my obtaining the particulars.

CASE XXV. Dr. FROMMHOLD, Buda-Pest, is reported by Semeleder as having cured an ovarian tumor by electrolysis, and another by external Faradisation, which will be separately mentioned hereafter. I have not been able to obtain particulars of these cases.

B. Cases in which Decided and Permanent Improvement only was observed.

Case I. Dr. L. Bopp, New York. — *Multilocular cyst of enormous size. One needle every other day for two months. Marked reduction in size, and particularly decided improvement in general health and strength. Still under treatment.* (Unpublished.)

Mrs. Osten, 44 years of age. October, 1874, to April, 1876, tapped eleven times; eight to eighteen pounds of different colored fluid being removed each time. Last paracentesis, April, 1876. Electrolytic treatment was begun October 17, 1876. Stöhrer's battery, twelve to fourteen elements used at each sitting for eight to ten minutes. General health very poor; hardly able to leave her bed. Measurement about umbilicus at tenth sitting 44″, October 29.

November 9. Fourteenth sitting, circumference 42″.

December 6. Twenty-seventh sitting, circumference 41″. General health being much improved, and patient able to go to work as a seamstress (sewing on the machine even), the treatment was interrupted until March 5, 1877, and then resumed, a sitting being given every third day. No inflammatory reaction whatever was experienced at any time. The treatment is still being continued, but the improvement thus far is so marked (so the patient assured me herself), as to warrant the case being recorded in this class.[1]

Case II. Dr. R. Hesse, Brooklyn. — *Unilocular cyst; three sittings, two needles; tumor diminished in one week from 35″ to 27″ in circumference. Apparently permanent result.*[2]

Patient first seen in October, 1874, and diagnosis of ovarian cyst made, which was confirmed by Dr. Noegger-

[1] February, 1878, the patient died, the tumor having again increased after the cessation of the treatment. The diagnosis was verified at the autopsy.

[2] *Am. Jour. Obstet.*, January, 1877.

ath. Patient, aged 43 years, noticed enlargement three years ago. Circumference at umbilicus about 29″. Again seen October, 1876. Circumference of abdomen now 35″. General health failing.

November 11, 1876. One needle connected with negative pole introduced into the tumor. Drescher's zinc and carbon battery; positive electrode was introduced into the vagina, touching the os uteri. The current used gave a direct shock to the tongue and decomposed water. Pain not great. Sitting ten minutes.

November 13. Circumference 3″ less, namely 32″; abdominal walls flaccid. Patient was able, for the first time in four years, to bend her body forward. Two needles (one platinized) with negative pole this time, fifteen minutes.

November 15. Circumference decreased to 29″. Abdominal walls flabby, similar to those after confinement. Intended to insert three needles, but not being able to define the boundary of the tumor clearly, introduced only two, fifteen minutes. Next day, circumference 27″. Patient had abundant micturition after each sitting.

November 30. Circumference still 27″. The cyst doubtless still contains fluid, but as the boundary of the cyst is so indistinct and the patient feels no inconvenience whatever, further treatment is indefinitely postponed until the cyst shall refill.

December 13. Cyst the same, but somewhat harder.

December 30. Continues well.

May 25, 1877. No reappearance of tumor. In good health.

CASE III. F. SEMELEDER, Mexico. — *Multilocular tumor; forty sittings; complete absorption of liquid contents; treatment discontinued on account of difficult introduction of needles.*

Patient 28 years of age, married, five children. Since last confinement, one and a half years ago, had noticed enlargement of abdomen. General health fair; beginning emaciation and anemia. Tumor soft, fluctuating, walls

thin, extending two inches above the umbilicus. Three hard lumps were discernible in the tumor. Treatment commenced toward the end of November, 1875, and continued till Dr. Semeleder's departure, February 15, 1876, being suspended only during menstruation, five days every month. At the latter date the tumor had shrunk to the level of the umbilicus.

In May, 1876, Dr. Schmidtlein, of Mexico, in whose care the patient had been left, and who continued the treatment, reported that the liquid contents of the tumor had been entirely absorbed, and that the last five or six times the introduction of the needle had been quite difficult, because of the reduction of the tumor. The number of sittings was forty.

C. Cases in which the Improvement was only Temporary.

Case I. Dr. H. O. Marcy, Cambridge, Mass. — *Multilocular cyst; twenty-two sittings; first decided diminution, then increase of tumor, probably by growth of new cysts.* (Unpublished.)

"Mrs. H., aged 27, married two years, never pregnant. She first noticed a slight enlargement in left iliac region in May, 1875. Two years previous she was injured by a child falling on her side when in bed, and was sore and lame for a month. General health good, menses regular, without pain. First seen January 10, 1876. Tumor was then of the size of a small cocoa-nut, movable, fluctuating, and distinctly outlined by conjoined manipulation. Diagnosis, ovarian cyst.

"*January*, 1877. Commenced treatment by electrolysis. Galvano-Faradic Company, N. Y., battery of sixteen cells. Positive needle introduced, negative applied by sponge electrode; time usually about ten minutes; fourteen cells. Entire number of applications twenty-two, every second or third day.

"After ten or twelve sittings, always at the house of patient, the tumor had decidedly diminished, was much firmer,

and was probably half the original size, when it was about the size of the uterus at the fifth month of pregnancy, reaching to the umbilicus or above. Treatment was omitted for three weeks, when the tumor was found perceptibly larger, and had increased by the growth of a new cyst to the right of the older and larger one, which still felt hard and firm. Treatment continued till about April 1, when the needle entered with difficulty. The tumor was hard and firm to the feel, without fluctuation anywhere, and had diminished to the size of a large cocoanut. I felt that the patient was probably cured.

"*April* 29, 1877. Condition again changed. The tumor has slowly enlarged; is, at least a portion of it, quite firm, and yet there is an elastic, fluctuating feel on bimanual examination. I am disposed to think the enlargement due to the growth of new cysts, and that the firm feel of the anterior lower portion is due to the contracted cysts operated on. This case is at least instructive, and may teach the reason of success in some cases, and of signal failure in others. It would seem to illustrate that which from theoretical reasoning would appear to be most probable, *i. e.*, that a single cyst would give the best results, while in a multilocular cyst it would be difficult so to change the growth as to prevent further development."

Case II. Dr. Joseph Schnetter, New York. — *Multilocular cyst; twenty-five sittings. Temporary decrease; then rapid and extreme increase, necessitating tapping by the aspirator. Decomposition of cyst contents; death from rupture of the cyst.* (Unpublished.)

Mrs. M. N. was delivered of her first child October 1, 1876. Was then in the care of Dr. A. Assenheimer, and seen by Dr. Schnetter in consultation October 7, when all the signs of a large cystic tumor of the right ovary were found. Tapped October 30, and about four and a half gallons of dirty, brownish, viscid fluid evacuated. The collapse of the tumor was only partial, about one third of the original mass remaining as a solid mass on the right side. Unmistakable

signs of intimate and extensive adhesions. The cyst filled up again in two or three weeks to nearly the former size, and electrolysis was decided upon. This was applied by Dr. Assenheimer several times at the patient's residence, and during January and February, 1877, by Dr. Schnetter in his office, twenty-five sittings being held altogether. The application was at no time followed by any symptoms of inflammation. For a time the tumor remained stationary, then a marked decrease in its size was noticeable. (Dr. Schnetter at that time expressed himself to me as highly pleased with the treatment, and expecting great things from it.) But suddenly, towards the end of February, the tumor again increased rapidly to such a degree as to render relief by tapping imperative, which was done by aspiration on February 21, the liquid removed being very much the same as that withdrawn at the first tapping. The solid part of the tumor was found neither increased nor diminished in size, although the electrolysis had been equally applied to it. No symptoms of inflammation followed the operation.

March 3. Dr. Schnetter was sent for and discovered a development of gas in the cyst, and advised the transfer of the patient to the German Hospital for the performance of the radical operation. During the drive through Central Park, March 5, symptoms of rupture of the cyst suddenly made their appearance, and the patient arrived at the hospital in a moribund condition, where she died on the following day. The autopsy was not permitted. It is to be remarked that electrolysis was not performed after the last tapping on February 21, and that the inflammation of the cyst and decomposition of its contents cannot be ascribed to the electrolytic treatment."

Case III. E. Cutter, Cambridge. — *Unilocular cyst; eight sittings, extending over three months. Reduction of tumor until a fluctuation wave could no longer be detected. Great relief from pain. Considered a perfect cure. Relapse after four months.*

Mrs. Read, aged 40 years, three children. Nervous temperament. Duration of present illness twelve months. Pretty constant pain in abdomen. The diagnosis of ovarian cyst was confirmed by Drs. T. G. Thomas, Kimball, and several others.

October 29, 1876. Dr. F. Semeleder introduced one gold plated needle into the cyst through the abdominal walls, and connected it with the carbons of the battery above mentioned. A sponge electrode was connected with the zincs and applied to the other side. Ten cells, three minutes. The patient at once returned to her home, three miles distant.

November 12. Immediately after sitting was taken with menses, which passed off painless and crampless, the first immunity of the kind she had had for years. Cyst reduced at least one third its size. Operation repeated with a Kidder *insulated* needle.

November 25. Tumor less than one half its original size. Much prostration and nervous disturbance. Applied two needles of Cutter's battery, ten cells.

November 28. Still prostrated, although she does housework. Cutter's battery, ten cells ; two needles, five minutes.

December 6. General health improved ; tumor about the same. States that each of the previous operations was followed by pain and tenderness, lasting some time. Battery as at last sitting. Suffered all night from pain after this operation. Menstruating, but owing to distance of residence application not postponed.

December 13. Tumor evidently smaller and firmer. Two needles, unusual resistance ; current three minutes. Menses suddenly stopped by last application.

December 21. Application repeated.

January 19, 1877. Cyst smaller and denser. Battery applied as before, for the last time.

March 28. No wave or distinct tumor to be felt. Palpation masked by fecal accumulations. General condition good.

P. S. Under date June 2, Dr. Cutter writes that he is

informed by Dr. Wheeler, the attending physician, that there are again signs of fluid in the cyst, and that he is reapplying the battery.

Case IV. Ultzmann, Vienna.[1] — Patient treated by electrolysis and dismissed cured. Tumor refilled; repeated tappings. Condition same as before electrolytic treatment.

D. Cases in which Electrolysis produced no Perceptible Effect whatever on the Tumor.

Case I. E. Cutter, Cambridge. — *Multilocular cyst with thick walls. Six sittings in five weeks; both poles inserted as needles. No change whatever.* (Unpublished.)

Mrs. M. E. Murray, 31 years of age. Tumor first noticed six years ago. General health good. Circumference 36_4 inches at umbilicus. Electrolytic treatment under Dr. Cutter's direction by Dr. C. C. Pike, of Peabody, Mass., commenced February 20, 1877. Ten cells of Cutter's galvanic C. and Z. battery for three to eight minutes; two needles, one positive, one negative. Considerable pain and soreness in abdomen, but no serious trouble. Five additional sittings of a like strength were held at intervals of about one week up to March 20; no appreciable effect was produced, the tumor being of exactly the same size as before treatment.

Dr. Cutter informs me that he intends pursuing the percutaneous method in this case.

Case II. Dr. Frank W. Rockwell, Brooklyn, N. Y. — *Two sittings; no effect whatever. Patient refused to continue treatment and demanded ovariotomy, which was successfully performed.* (Unpublished.)

But two sittings were held, the Bartlett battery made by the N. Y. Galvano-Faradic Co. being used. The negative pole was thrust into the cyst (a monocyst), and the positive electrode applied externally. The strength of the current at the first sitting was twelve elements; at the second eighteen elements; the length of each sitting ten minutes. A bright erythematous blush followed the second operation, occur-

[1] *Loc. cit.*

ring over the spots where the positive pole had rested, and lasting some hours. Not finding any relief from these two applications, the patient refused to continue the treatment and demanded the removal of the tumor. This was performed April 23, 1877, with perfect success.

No traces of the punctures made by the needle March 1 and 4 could be detected on the cyst wall.

Of course this case can scarcely be considered a fair test of the electrolytic treatment, but it is quoted as an instance where ovariotomy followed the treatment.

CASE III. PAUL F. MUNDÉ, New York. — *Patient fourteen years old, unilocular cyst; twenty sittings, positive needle only, every other day, five to twenty minutes. No change in tumor whatever. Slight increase at date.* (Unpublished.)

S. K., fourteen years of age; never menstruated; general health fair, but gradually becoming weaker and paler during the past year. Tumor first noticed some nine months before she came under observation, since which time it has grown slowly to its present size. During the last three months it has grown somewhat more rapidly, and a great deal of pain has been experienced, particularly in the right iliac region.

I saw her first in September, 1876, and decided that the tumor was probably ovarian. The patient was seen at this time also by Drs. E. J. Messemer, to whose courtesy I am indebted for the case, C. Williams, and Mary Putnam-Jacobi, who withdrew a clear, yellowish fluid from the cyst by the hypodermic syringe, which, on being examined under the microscope, showed granular corpuscles and epithelial cells. The patient was lost sight of for several months, and when she returned towards the end of December the tumor was found to have grown rapidly during the interval, and the patient to have become more feeble and markedly cachectic.

December 27. I repeated the hypodermic removal of fluid, which was found by Dr. M. D. Mann to contain the same microscopic ingredients as those already detected, but no ovarian corpuscles. It was a clear, viscid fluid, consist-

ing mainly of albumen, and there was no question in the minds of Drs. Semeleder, Tauszky, and Mann, who also examined her, that the tumor was an ovarian cyst, probably unilocular, with large dense masses on the right side. The size of the cyst was about that of the uterus in the eighth month of pregnancy, reaching nearly up to the ensiform process, and unusually prominent through the slender figure of the scarcely developed girl.

December 29. The measurements were:—

Circumference at umbilicus	29¼″
Circumference midway between umbilicus and symphysis	29¼″
Distance from symphysis to ensiform process . . .	14″

The skin was tense, the tumor being evidently contiguous to the parietal peritoneum. Greater enlargement on right side, from which ovary the tumor probably sprang. *Per vaginam*, hymen, uterus slightly retroverted, tumor fluctuating in anterior cul-de-sac.

Dr. Semeleder, to whom I applied for advice as regards the electrolytic treatment, gave me the following directions, which I followed closely, except as regards strength of current and length of sittings. "I advise you to use for electrolysis of ovarian cysts a current which can be borne without pain when both poles are applied to the tongue; four elements of your battery (N. Y. Galvano-Faradic Co., sixteen cells). The sittings five minutes each. If well borne, every day; otherwise, every other day, continuing for four to six weeks. Only the positive pole should be inserted, the negative applied to the abdomen over the tumor with a sponge electrode or one of metal with blotting paper wet in salt water placed between it and the skin."

January 2, 1877. Electrolysis was commenced in my office in the presence of Drs. Tauszky and Mann, Dr. Semeleder having already left the city. The current used, four elements, decomposed salt water readily. An insulated steel needle was introduced, and the current applied for five minutes. Slight pain. The application was followed

by more copious micturition than usual, and produced no reaction. Sittings continued every other day. At the sixth sitting the patient stated voluntarily that the former severe pain in the right side had entirely left her within a few days.

February 5. Fourteenth sitting. Dimensions same as always, but appearance of abdomen changed; it is flatter, more equally distended; instead of being higher on the right side, as formerly, there is now a marked protrusion in the left lower angle of the abdomen. The tumor now extends up to the diaphragm, and seems to have been lifted out of the pelvis, being no longer accessible to the finger in the vagina. It appears, as it were, more compact, more distinct from the other viscera, and movable in the abdominal cavity. The patient complained of having suffered a great deal of pain in the left side after the last application, and had noticed the peculiar change in the configuration of her abdomen. I thought we were on the verge of a decided change in the tumor, precursory of its diminution. The increased cachectic appearance of the patient, her unusually sunken eyes and hollow cheeks, show the constitutional participation in the local change, whatever that was. Her pulse and temperature, however, were normal, and there was no pain in the abdomen.

February 7. Tumor the same, only more solid in its feel, and a fluctuating spot for the insertion of the needle less easy to determine.

February 10. The tumor has regained nearly its original shape and outline, and distinct fluctuation has again become discernible. For the sake of ascertaining whether any change had taken place in the fluid, I drew off another hypodermic syringe-full of clear, light brown liquid, which was found to be precisely the same as before the treatment.

March 6. Twentieth and last sitting. The number of elements used, and the length of the sittings had been gradually increased, until, during the last three sittings, fourteen to

sixteen elements were used for fifteen to twenty minutes, causing some pain. No change whatever had taken place either in the dimensions, shape, or configuration of the tumor, and the only benefit that the patient seemed to have derived during or from the electrolytic treatment was the absence of pain in the abdomen, from which she had formerly suffered, and a slight improvement in her general health, which was probably largely due to a persistent course of tonics. No peritonitic symptoms had appeared at any time, neither did adhesions appear to have formed between the peritoneum and the tumor.

May 1. Dimensions slightly increased.

Circumference at umbilicus	30½″
From symphysis to ensiform process	14½″

General health excellent.

May 22. Tumor again somewhat enlarged. Umbilical circumference 31¼″.

General health not so good; complexion more pallid than at last visit. No inconvenience from the tumor, however, except its weight. Therefore the radical operation was postponed until a rapid increase of the tumor or urgent symptoms should require it.

Now, while for a time the growth of the tumor in this case seems to have been arrested by the electrolysis, and the freedom from pain and improvement in general health may fairly be attributed to some extent to that treatment, still it is evident that even that slight improvement was but temporary, and that the tumor is again slowly but surely growing. The entire absence of the positively curative influence of the electrolytic treatment in this instance, besides, induces me to include the case under the negative class.[1]

CASES IV. AND V. BENEDIKT, Vienna. — Large tumors,

[1] *March* 4, 1878. Tumor considerably enlarged; circumference at umbilicus 35″; patient complains of slowly increasing debility. Ovariotomy advised without further delay.

thick, viscid fluid. Frequent electrolysis, entirely ineffectual. Ovariotomy by Carl Von Rokitansky, Jr., successful. In one case adhesions of cyst to abdominal wall corresponding to acupunctures, of fresh origin. Had never been tapped.[1]

Case VI. Dr. J. T. Everett, of Stirling, Ill., writes me that he is performing electrolysis on an ovarian tumor with an entirely negative result. It is more dense than his other successful cases.

E. Cases in which decided Injurious Results accompanied or followed the Electrolytic Treatment.

(*a.*) *Peritonitis or other Unpleasant Symptoms ending in Recovery.*

Case I. Thomas — Semeleder, New York. — *Multilocular cyst, three sittings; local inflammatory symptoms; electrolysis discontinued. Ovariotomy, removal of both ovaries. Recovery. No adhesions.* (Unpublished.)

Miss K. G., aged 26, was admitted to the Woman's Hospital, New York city, service of Dr. T. G. Thomas, in November, 1876.

Menstruated at 14. First noticed in May, 1876, that she was increasing in size; did not notice that either side enlarged more than the other. Has at no time had pain. General health excellent, has lost no flesh, never having been stout. Appetite good; bowels regular. No history of peritonitis.

Physical Examination. Uterus $2\frac{1}{4}''$ deep; position normal. No sense of fluctuation in vagina. Abdomen occupied by a cystic tumor; distinct fluctuation about median line, but the wave is not transmitted from side to side.

November 30. Electrolysis (Semeleder); fine platinum needle connected with positive pole of battery being inserted into tumor about three inches to the left of median line, two inches below umbilicus. A sponge attached to the negative pole being placed on the right side the current was

[1] Ultzmann, loc. cit.

allowed to pass for five minutes. No pain or disagreeable symptoms were experienced either before or after the operation.

December 2. Operation repeated. After operation, measurements; no appreciable change.

December 7. Operation repeated, ten minutes; patient complained very much of burning pain during the passage of the current; pain continued through the night.

December 8. Patient still complains of sharp pain at place of puncture. Temperature, 99.5°; pulse 90. Magendie's solution M. viii. for the pain.

December 9. Considerable redness remains about point of last puncture.

December 13. Measured waist 35″; L. A. S. S. I. to umbilicus $8\frac{1}{4}$″; R. A. S. S. I. to umbilicus 8″; P. to U. 9″; U. to E. P. 7″.

January 2, 1877. It being considered dangerous to continue electrolysis, ovariotomy was proposed and accepted, but deferred till after next menstrual period. The patient left the hospital.

January 22. Operation at her house by Dr. Thomas, it being considered unadvisable to operate in the hospital, owing to its hygienic condition at the time. Both ovaries removed. Recovery.

No adhesions were present, and neither the peritoneum nor the wall of the cyst showed signs of the electrolytic punctures, or traces of recent inflammation.

Case II. Thomas — Semeleder, New York. — *Small ovarian cyst; seven sittings; no change whatever. Discharged. Two weeks later returned with local pain and tenderness; fever; cyst much enlarged. Lost sight of; termination unknown.* (Unpublished.)

E. H., Hamilton, Ontario. 30 years. Married. One child. Two miscarriages.

Three years ago had pains in the left side, always coming at irregular intervals. Never noticed any enlargement till a year ago, when a surgeon called her attention to it.

Since that time her left side has slowly but steadily increased in size. Frontal headache almost constant. Appetite good. Bowels generally regular.

Physical Examination. Small ovarian cyst in left hypogastrium. Measurements: —

Girth	$32\frac{1}{2}''$
L. A. S. S. I. to umbilicus . . .	$6\frac{3}{4}''$
R. " " " "	$7\frac{1}{2}''$
Ensiform cartilage to umbilicus . .	$6\frac{1}{2}''$

December 9, 1876. Electrolysis employed. Current passing ten minutes, causing but little pain and no inconvenience afterwards.

December 11. Electrolysis repeated, but was discontinued after six minutes, owing to some defect in the battery, which caused the current to intermit and give pain.

December 13. Electrolysis repeated, current passed six minutes.

December 17. Electrolysis six minutes.

December 23. Period came on after last operation, and electrolysis was not repeated till to-day; current passed ten minutes. Measurement shows no diminution of tumor.

December 26. Electrolysis ten minutes.

December 30. Electrolysis ten minutes.

January 14, 1877. No change in tumor; patient discharged unimproved.

About January 25, returned, saying that she had suffered a great deal since her discharge from abdominal pain and fever. The abdomen was found enlarged and tender. The cyst, which formerly was about the size of an infant's head, had grown to the size of the head of an adult, and was tender to the touch. Pulse and temperature were both higher than normal. Although told to remain in the hospital, she left saying she would call again in a few days, but has not been heard from since.

CASE III. ULTZMANN, Vienna.[1] — *Repeated electrolysis, continual diminution and refilling of cyst. After a pause*

[1] Loc. cit.

of several months electrolysis recommenced. Acute pain and peritonitic symptoms probably caused by needle striking old adhesions.

Patient was treated by electrolysis, by Ultzmann and others, always with diminution of the tumor, which regularly filled up again, however. After a pause of several months electrolysis was recommenced. Immediately after passing the needle into the cyst, the patient experienced a severe drawing abdominal pain, which increased so much with even the weakest current and spread to the rectum and bladder, that the needle was withdrawn after five minutes. Abdominal colic, rectal and vesical tenesmus followed in rapid succession, and the patient was put to bed with some difficulty, where she remained a week. Ultzmann explains these symptoms by the suggestion that the needle happened to strike old adhesions dating from former electro-punctures, and caused contractions of the adherent parts, and thus the severe pain.

CASE IV. ULTZMANN, Vienna.[1] — *One sitting, mild current, ten minutes. After thirty hours peritonitis and persistent bilious vomiting persisting for a week. Patient's life saved only by paracentesis. Fluid removed contained blood and pus. Recovery.*

Mrs. H., aged 45 years, large ovarian tumor of several years' standing. General health good, but emaciated. Appetite good, no fever, hopeful and bright of disposition. Desired electrolysis. One platinum needle attached to the negative pole was inserted, and the positive pole placed on the abdomen. The sitting was painless, and lasted only ten minutes, ten to twelve elements being used. The same evening the tumor was apparently somewhat smaller and softer. Thirty hours after the sitting, the patient had a sudden chill; peritonitis set in, with bilious vomiting, which latter persisted for a week, and rendered the condition of the patient very precarious. Prof. Carl Braun was then called in consultation, and advised immediate tapping. This

[1] Loc. cit.

was done, and ten litres of thin, chocolate-colored fluid evacuated, which, under the microscope, showed blood and some pus corpuscles. The vomiting soon ceased, and the patient improved and recovered; a fortunate termination, ascribed by Ultzmann entirely to the timely tapping. Electrolysis was of course not resumed.[1]

(*b.*) *Peritonitis, terminating fatally.*

Case I. Semeleder, New York. — *Polycyst. Five sittings in two weeks. Speedy peritonitis, rapidly terminating fatally. Suppuration of cyst-contents. Needle punctures visible, and fresh adhesions around them.*

Miss P., aged 44, always menstruated regularly, but suffered from dysmenorrhea and menorrhagia. In August, 1875, she first noticed a rapidly increasing enlargement of the abdomen, chiefly on the right side. In August, 1876, she had an attack of acute abdominal pain, accompanied by a marked change in the tumor, one portion of it becoming hard and the other soft. She soon after entered the New York Woman's Hospital, service of Dr. T. G. Thomas, who recommended her to Dr. Semeleder for electrolytic treatment, the tumor not being considered favorable for operation. Electrolysis was performed by Dr. Semeleder five times in two weeks, "the patient growing much weaker with each application; notwithstanding which, daily visits were urged by the electrician." This quotation, as well as the above and subsequent details, are taken from a history of the case, published by Dr. Arthur T. Hills, of New York, a homeopathic practitioner, in the "Homeopathic Times" for March, 1877, into whose care the patient then fell, disappearing entirely from Dr. Semeleder's observation. The

[1] An additional case of peritonitis after a single electropuncture occurred in the practice of Dr. Rudolph Tauszky, of New York, during the fall of 1877. The patient gradually developed suppuration of the cyst and septicemia, and died during ovariotomy, which was performed by Dr. Peaslee as a last resort, and was very difficult, owing to the numerous adhesions.

substance of Dr. Hills' remarks is as follows: November 10, he was called in haste to see the patient, and found her in high fever, pulse 130, hot, burning skin, labored respiration. The needle punctures were plainly visible on the abdomen, which was not tender, however. The same evening severe excruciating abdominal pains and vomiting came on; she was very pale; the pulse small and wiry, great dyspnœa. Hot fomentations, etc., were ordered. Early the next morning Dr. Hills was awakened with a message that Miss P. was dying. On arriving at the house he found that she had just expired.

Autopsy. Free ascites. The needle punctures were plainly visible on the peritoneal surface, and fresh inflammatory deposits were present around them. The tumor contained a fluid resembling that found in the peritoneal cavity, and also a cheesy substance, which, under the microscope, showed an abundance of pus corpuscles. A fibrous tumor was attached to the fundus uteri externally, and a polypus internally.

It should be noted that the time between the cessation of the electrolytic treatment and the date of the discovery of peritonitis November 10, is not stated, neither what pole, and how many needles were introduced. Still, there can be no question that the fatal peritonitis and the adhesions were caused by the electrolytic punctures, the evidences of which I myself have distinctly seen on the specimen.

Case II. Semeleder, New York.[1] — *Enormous multiloc-*

[1] *New York Med. Jour.*, March, 1877. In the *Homeopathic Times*, for March, 1877, while looking for the case above reported, which I had been informed was there printed, I accidentally came across the report of an *Ovarian Tumor with Autopsy*, by Mrs. J. G. Brinkman, M. D., in which electrolysis was followed by peritonitis and death, which as regards measurements and various particulars, so closely resembles the case briefly mentioned by Dr. Semeleder in the *New York Med. Jour.*, beginning with "I lost a patient from peritonitis," that I have no doubt whatever of its being the same case, and therefore report it as such, having besides other good reasons for feeling sure of the identity of the two cases. I make the report full, copying it almost

ular tumor, two tappings during treatment; thirteen electric sittings, five to ten minutes each within twenty-seven days; patient weaker after each sitting. Sudden collapse and death on the day of the last sitting. Fresh adhesions and extensive suppuration of cyst contents.

Mrs. Dr. A., a homeopathic practitioner, aged over 50 years. Multilocular ovarian tumor measuring 52½″ at umbilicus and extending far above it. Growth of tumor rapid; general health fair; able to attend to daily duties up to date of first operation.

November 17, 1876. First electric sitting five minutes; needle attached to positive pole, opposite pole placed on abdomen. The immense size of the tumor called for paracentesis; forty-five pounds of clear, amber-colored fluid were removed, which reduced the tumor one half.

Nights restless after sitting; patient perfectly helpless; great distress, faintness, and soreness in the abdominal organs. Cough. Urine increased in quantity only for the first few days. No appetite.

November 20. Slight improvement in general condition, temperature 103, pulse 112.

November 21. Sat up half an hour; temperature 100, pulse 100.

November 22. Electricity applied for ten minutes 10 A. M., pulse 104, temperature 102; 5 P. M., pulse 102, temperature 103.5.

November 23. Less distress on motion; 10 A. M., pulse 100, temperature 102; 5 P. M., pulse 100, temperature 103.

November 24. Much distress through night, abdomen distended, much pain; 10 A. M., pulse 112, temperature 102.5; 5 P. M., pulse 120; temperature 103.5.

November 25. Stronger; electricity applied for ten minutes.

verbatim, because it probably is entirely new to the regular profession, and also, because the daily notes of pulse, temperature, and general condition are necessary to a proper appreciation of the progress of the case.

November 26. Removed by tapping 30 pounds of syrup-like fluid. Sleep very poor to date.

November 27. Slept all day; 10 A. M., pulse 102, temperature 101; 5 P. M., pulse 96; temperature 102.5.

November 28. Tumor measured 42″ over umbilicus. Electricity for ten minutes. Sleep restless, with moaning and talking; 6 P. M., pulse 104, temperature, 102.

November 29. Great distress and soreness in abdomen; 10 A. M., pulse 92, temperature 101; 5 P. M. pulse 96, temperature 103.

November 30. Both needles inserted into the sac for ten minutes; patient in half stupor all day.

December 1. Same stupid condition. Five P. M., pulse 100, temperature 103.5.

December 2. Same half-sleepy condition. Slight suppuration from punctures of November 30, and skin deep red over circumscribed portions, abdomen not specially sensitive to pressure. Five P. M., pulse 116, temperature 103.5.

December 3. Weak and exhausted.

December 4. Electricity applied ten minutes; complained afterwards that contents of tumor seemed like burning hot water.

December 5. Same burning heat in tumor; pulse 104, temperature 102.5.

December 6. Appetite improved; electricity six minutes.

December 7. Electricity ten minutes. Three P. M., great distress, pain, chill, face sunken and anxious, lasting about two hours.

December 8. Electricity ten minutes; patient quiet, pulse 104.

December 9. Electricity five minutes; urine scanty and dark.

December 10. Weak, but comfortable. Electricity five minutes; pulse 100.

December 11. Weak and nervous.

December 12. Electricity ten minutes; pulse 108.

December 13. The same. Electricity ten minutes. At

2 P. M., sudden distress and pain in bowels ; chill, vomiting, loose stools. At 5 P. M., pulse 130, very weak ; 8 P. M. profuse perspiration, coldness of surface. Patient died at 3 A. M.

Autopsy showed peritonitis, which Semeleder thinks had evidently started from the point where once only (November 30) he had inserted both needles, and passed a current capable of decomposing .15 cubic centimeters of acidulated water per minute. The point of insertion of the negative needle was marked by a slough $\frac{1}{8}''$ in diameter ; at the positive pole there was merely a dry, burnt spot a little larger than the needle. Around several of the needle-punctures there were slight fresh adhesions ; at the spot of the first tapping there was a patch of cicatricial tissue $\frac{3}{4}''$ in diameter. The tumor was composed of eleven cysts, with liquid or gelatinous contents. There was extensive suppuration of the cyst.

From the above report it must certainly seem that inflammatory reaction followed very soon after the first electrolytic sitting and tapping, not alone after the introduction of both needles, as Dr. Semeleder supposes. Whether the electrolysis or the tapping gave the first incentive to inflammation and suppuration of the cyst is a question open to discussion. At all events the danger occasionally attending electro-puncture is sufficiently illustrated by this case.

CASE III. ALEXANDER J. C. SKENE, Brooklyn. — *Monocyst. One sitting ; two negative needles, twelve cells for five minutes. Thirty hours later peritonitis, which continued for eleven days and then subsided, but the patient never recovered her strength, and died on the twenty-third day.* (Unpublished.)

Mrs. N., aged 47 ; four children, youngest eleven years old, since birth of which her health has not been good. Five years ago attack of menorrhagia returning for several menstrual periods. About that time she noticed a tumor in the left inguinal region which has been growing ever since. Menses now regular (August 23, 1876).

Last winter she had what was called inflammation of the lungs, but no doubt was pleurisy. Now she has fluid in left pleural cavity. Pulse 118, temperature 102.5. Diagnosis: Large ovarian cyst and old pleuritis.

December 13. Pleuritis has subsided and patient is stronger, but not in a condition for ovariotomy. Circumference at umbilicus 40¾″. From pubes to ensiform cartilage 20¾″. Two needles were introduced into the cyst and connected with the negative pole, the positive electrode being introduced into the vagina; twelve cells of Drescher's battery were used for fifteen minutes. A coffee-colored fluid escaped from the openings when the needles were withdrawn. Slight pain in the vagina at first, and then at needles. Fluid easily decomposed outside of the body.

December 14. Thirty hours after the operation, chill at 3 P. M., followed by fever and vomiting.

December 15. 5½ P. M. signs of peritonitis, pulse 120, temperature 102.5.

December 16. Pulse 120, temperature 101.

December 17. Pulse 102, temperature 100.5. Has had diarrhea and vomiting ever since 15th, which continued until 23d.

December 18. Pulse 100, temperature 100.5.

December 19. Pulse 106, temperature 99.5. Quinine first two days and continued throughout.

December 20. Pulse 134, temperature 99.75.

December 21. Pulse 104, temperature 100. Diarrhea less.

December 22. Diarrhea worse, pulse 100, temperature 100.

December 23. Better; pulse 100, temperature 98.5.

December 25. Better; diarrhea and vomiting stopped, pulse 100, temperature 100.

The acute symptoms subsided, but the patient continued to lose strength and died on the 6th of January, 1877, twenty-three days after the operation. Tumor unchanged in size. "I am satisfied" (says Dr. Skene) "that the operation caused the peritonitis which hastened her death."

CASE IV. DR. GEORGE ROSS, Montreal. — *Multilocular tumor. Both needles introduced; twenty-four sittings, each attended with some tympanites, but followed by general improvement and marked decrease of tumor. Then sudden enormous tympanites relieved only by repeated aspiration of a large quantity of sulphureted hydrogen gas. Rapid collapse and death. Autopsy shows cavity of cyst communicating with peritoneal sac, by recent needle puncture, also large hemorrhagic effusion into smaller cyst, rupture of this into peritoneal cavity.* (Unpublished.)

"C. L., 38, a large, healthy-looking Irish woman. Has been five years married; no children or miscarriages; menstruation always regular. About the month of June, 1876, began to notice her abdomen commencing to enlarge, but could not definitely say at one side more than the other. From this time she found her appetite failing, and began to suffer from occasional attacks of vomiting. The abdominal enlargement continued to increase and the sickness to be more frequent, when she was admitted into the Montreal General Hospital, under my care, October 7, 1876.

On admission complained much of a pain in the left side of the abdomen which has been present for a month past, accompanied by frequent sick stomach. There is considerable dyspnea, patient being seldom able to lie down in bed. The bowels are obstinately constipated and the tongue furred. Considerable frequency of micturition, the urine being scanty and painful in evacuation.

The abdomen is found to be occupied by a large tumor possessing all the usual characteristics of a multilocular ovarian cyst. Girth at the umbilicus forty-three inches. From anterior-superior spine to umbilicus on right side ten inches, on left side eleven inches. Fluctuation is most distinct upon the right side, where also the surface of the tumor is smooth, whereas upon the left and above, irregular projections of small cysts are distinctly to be felt, and the whole mass seems more solid. The skin can be freely moved over every part of the tumor. (Patient is

stout and there is a very large quantity of subcutaneous adipose tissue.) Two days after admission she began to suffer from a thrombus of the right femoral vein accompanied by fever, rapid pulse, frequent vomiting, great pain, and considerable swelling in the right leg. This, under treatment, subsided in about seven days, and was succeeded by a repetition of the same trouble in the left leg. Meantime the abdomen was slowly increasing, and the distress augmenting, pains in various parts of the abdomen, anorexia, vomiting, etc. I therefore, on 22d October, tapped the tumor with the aspirator-needle and drew off thirteen and a half pints of very dark brown, somewhat viscid fluid. The umbilical girth before tapping was forty-three and a half inches; after tapping thirty-seven and a half inches. The large mass of smaller cysts could now be distinctly felt inclining rather to the left side of the abdomen, and composed of an irregular aggregation of rounded lumps of various sizes. The relief, of course, was great; the stomach could retain food, the pains disappeared, the bowels acted and the appetite returned. Shortly after she underwent a second severe repetition of the phlegmasia in the legs, previously described, during which time it was not thought advisable to pursue any other treatment.

On 30th of November, her condition generally being tolerably satisfactory, the application of electrolysis was begun. Girth at this time thirty-eight inches. The battery used was one containing six cells of the character of Daniells', viz., zinc and copper, with dilute sulphuric acid, and solution of sulphate of copper. Tested beforehand by plunging the needles attached to the poles into a glass of water slightly acidulated with sulphuric acid, decomposition of the water was seen to be rapidly effected, bubbles of gas being given off in a continuous stream. The electrodes were long steel gilt needles which were passed deeply into the tumor, one on either side. The current was then passed for ten minutes. Considerable burning pain at the negative pole was felt. Clear evidence of electrolytic action

upon the contained fluid was obtained by percussion, an area of several inches in circumference at the upper part of the tumor being found to emit a clear amphoric note, whereas, of course, previously, it was perfectly dull. There was a good deal of corrosion of the needles, but very much more on the negative than on the positive. For some days the punctured spots remained tender, and the negative one became somewhat hard and red. On 5th December, a second sitting of similar duration was given with a repetition of the same phenomena, and on the 9th December the girth is noted at forty inches, but at the same time the general feelings of the patient were much improved. The electricity would seem also to affect the bowels, as on each succeeding day they are unusually relaxed. Applications were made on the 11th and 18th December without further result. At this time, owing to very free menstruation, the treatment was suspended until 3d January, 1877, when it was resumed and continued regularly as described, three times a week, until 12th March, there having thus been twenty-four sittings in all. During this time the abdominal girth had been steadily diminishing until from forty inches it had fallen to thirty-five and one half inches, a less circumference than was obtained after tapping the main cyst. The abdominal walls were of course correspondingly lax, and the remaining mass could be explored in every direction. The improvement in the general condition of the patient was also very marked. She was free from pain, and quite cheerful. Could eat, drink, and sleep well, and gained much in strength. This was her condition on the morning of the 15th March, the last application having been on the 12th March. Seen by the house-surgeon at 9 A. M. She was quite comfortable and ready to have a sitting that day. Very shortly after this, however, she observed that her abdomen was rapidly swelling, so much so as soon to become very painful. Dr. Cline, the house-surgeon, saw her at 11 A. M., and found the abdomen much distended and tympanitic. He therefore ordered turpentine epithems and an

enema of the same. This gave no relief, and by afternoon she was suffering much distress and frequently vomiting. The tympanites having now enormously increased, a medium-sized aspirator needle was introduced, which gave vent to a quantity of gas distinctly smelling of sulphureted hydrogen. Some relief followed. I saw her at 9 P. M. Found the patient sitting up with great dyspnea and rapid breathing, quick, small, shabby pulse, blue extremities, which were also cold, frequent vomiting. A larger needle was again introduced, giving escape to a copious flow of the same sulphureted hydrogen gas. Some hypodermic morphia was administered. She continued to sink, and died on the morning of the 16th March. I was fortunate in being able to secure an autopsy, from the record of which I take the following extract concerning the condition of the parts within the abdomen: "On opening the abdomen a small quantity of fetid gas escaped from the peritoneal cavity, and a large quantity of the same from a small puncture which had been made in the front of the sac during life. About seventy-five ounces of a turbid sanguineous fluid were removed. The sac of an ovarian tumor fills up the whole of the front part of the abdomen. The anterior wall of the same is of a dark red color, and scattered over with small extravasations. It is adherent above to the great omentum, which is pushed up. On the anterior surface the tumor is attached to the peritoneum over an area about two inches in diameter, to the right of the umbilicus, and over another similar but rather smaller spot on the left side, and at both these points the membrane is very much thickened. At the upper part of the tumor is a large, solid mass, attached to the mesocolon. On separating this from its attachments, which are not strong, the parts about are seen to be infiltrated with blood, and on close inspection a large portion of the solid mass is seen to be hemorrhagic. The hemorrhage has apparently taken place into the semi-solid cysts, which, becoming distended, have ruptured, permitting the blood to escape into the peritoneal cavity. About one

hundred and fifty ounces of a dirty brownish fluid were removed from the sac. The lining membrane is dark in color and to the touch emphysematous."

CASE V. DR. GEORGE ROSS, Montreal. — *Unilocular tumor; about twenty-one sittings; no marked benefit. Repeated tappings during treatment. After last sitting local peritonitis at seat of puncture, and general collapse, apparently general subacute peritonitis. Ovariotomy; death; Firm, dense adhesions, at sites of needle-punctures.* (Unpublished.)

"M. L., aged 24, was admitted into the Montreal General Hospital on the 13th October, 1876, with a large abdominal tumor. She is a small, slim, French-Canadian girl, unmarried. Has always been delicate, and has long suffered from dyspeptic symptoms. Menstruated since 14, but never very regularly, and has even passed as much as six months. Last winter first noticed a lump in the left side as large as the closed fist. It rapidly increased, and for relief she has been tapped four times by the local surgeon, at intervals of about two months. She says about two pailfuls of yellow fluid were drawn off on each occasion. At present she is able to move about pretty well, but has occasional attacks of dyspnea, and complains of pain in the back and difficult micturition. This patient has a very thin, wasted look, and says she has become very thin and very weak since the commencement of her illness. The abdomen is pretty uniformly distended by a smooth-walled tumor through which the sense of fluctuation is peculiarly distinct in every direction. Girth at umbilicus thirty-seven and one half inches.

On the 19th October, treatment by electrolysis was commenced, the mode of procedure being exactly the same as that detailed in the case of *C. L.*, that is, repeated every third day. On the 22d the girth is noted at thirty-nine inches; on the 29th, forty inches; November 8, thirty-eight inches; November 14, thirty-six inches; November 19, thirty-four inches. With the view now, to shorten the

treatment if possible, I determined, after the next sitting, to tap and remove the remaining contents of the cyst. Accordingly, on November 28, having applied the electricity for ten minutes as usual, I introduced an ordinary aspirator needle and drew off six pints of fluid. It was yellow, transparent, and viscid, like strained honey. Girth after tapping thirty inches; November 30, thirty-three inches; December 2, thirty-two inches. From this time the tumor increased pretty rapidly in size, and the abdomen became tense in spite of the continuance of the electricity as before. December 19, thirty-six and a half inches; December 21, thirty-seven and a half inches. On the morning following the application on this day she complained of severe pain near the puncture on the right side, fever, and headache; the pulse rose to 120, the temperature to 103° F. There was considerable tenderness around the part complained of, which was clearly the seat of local peritonitis. Ordered three leeches, followed by linseed poultices and one quarter grain morphia every four hours. Under this treatment the local symptoms were soon relieved, but the temperature and pulse continued high, and the fluid rapidly increased in amount, producing great tension, with shining of the abdominal walls, with much pain, dyspnea and exhaustion.

I was therefore obliged, through urgency of the symptoms, to tap again on December 30, when fourteen and a half pints of similar fluid were removed. Even after this her condition remained unsatisfactory, abdominal pain, vomiting, a weak and rapid pulse, etc. By January 9, 1877, the fluid had all re-collected, and she measured forty inches. Great dyspnea, she could retain no food, and evidently would soon die of exhaustion. In this desperate state of things I determined to give my patient the chance of ovariotomy. Having held a consultation of my colleagues in which they concurred in the propriety of the operation, I proceeded to the removal of the tumor by gastrotomy on January 10. I need not describe the operation, the only

point calling for special mention being the very firm and thick adhesions on both sides of the tumor at the seats where the punctures had been practised. These were unusually tough, and could only be torn through with great difficulty. There were no intestinal or other adhesions of any moment. The galvanic cautery was used to arrest hemorrhage from all the smaller points. All instruments and sponges were carefully carbolized. The patient never rallied fully from the operation, though most carefully nursed, and died quietly at 7 A. M., the following day.

The autopsy showed abundant signs of recent lymph from peritonitis, — raw surfaces corresponding with the situation of the needle punctures."

CASE VI. DR. EMIL FLIESS,[1] New York. — *Large multilocular tumor; general health poor. About twenty-five sittings, the first sittings followed by fainting-fits and great prostration. Considerable decrease of the tumor and general improvement. Last sitting only external galvanization; same day peritonitis. Death. No autopsy.*

Patient aged 30, married, three children. Tumor noticed two years previously. General health poor. Circumference at umbilicus ninety-eight centimeters; distance from symphysis to ensiform cartilage, 46.5 centimeters. Abdomen very much distended.

Treatment by electrolysis was commenced November 21, 1868, and continued every second or third day until January 9, 1869. The first puncture was very painful, and was followed by a fainting-fit; current eighteen elements, eight minutes. The pain caused by the electro-punctures required the application of wet cloths at home after every sitting, at first from six to eight, later, only from one to two hours.

November 23. Yesterday less pain, but several fainting-fits; circumference of abdomen diminished two centimeters. Second electric sitting, fifteen minutes, followed by severe fainting-fit.

[1] *N. Y. Med. Jour.*, Jan. 1877.

November 25. Abdomen one centimeter more than last time. Much pain. Third sitting, eighteen minutes, no fainting-fit.

November 25 to 29. Diarrhea and copious micturition; great debility, but sleep improved. After the fourth sitting, the application was always made for thirty minutes, the strength of forty elements being gradually reached and continued, without inconvenience to the patient. The abdomen became more and more flabby and the skin soft and rugous, the sensation of fullness was to a great extent relieved, the general health improved, the fainting-fits disappeared, and the patient appeared in a fair way to be rid of her tumor.

The fourteenth, sixteenth, eighteenth, and twentieth sittings consisted merely in the external application of the galvanic current, from which the benefit seemed to be about the same as from the galvano-puncture.

January 9, 1869. The circumference of the abdomen at the umbilicus was found to have decreased from ninety-eight to eighty-three centimeters. The upper margin of the tumor could be felt as a distinct ledge, about four centimeters above the umbilicus, but losing itself laterally.

January 9. The patient came to Dr. Fliess' office feeling exceedingly well and in good spirits. Galvanism was applied externally, and she returned home partly on foot and partly by the stage. After feeling well the whole day, she was suddenly attacked by a fainting-fit, followed by a chill, severe pain in abdomen, chiefly in left side, great abdominal distention, fever, and great prostration. There was fluctuation over a greater surface than before, and the abdomen was very tender to the touch. The latter symptoms improved somewhat, but the strength failed, and on January 14 stercoraceous vomiting came on, which continued till her death on the 18th. An autopsy could not be obtained.

It should be mentioned that the negative needle was not introduced directly through the skin, but that a steel trocar and canula were first introduced, then the trocar withdrawn

and a wire, insulated almost to the end, passed through it into the fluid. What the cause of the fatal peritonitis was is a matter of question ; but Dr. Fliess, while recommending the method for further trial, advises the precaution of undertaking it either in the patient's house or in a hospital. The fact that the peritonitis followed immediately after the last galvanic sitting will certainly give color to the supposition that the electricity, even though it was merely applied externally, was the exciting cause.

Cases VII., VIII., IX., are merely mentioned by Dr. von Ehrenstein (see above), and referred to here as authentic on the authority of that gentleman. Particulars are unknown.

Although the passage of a galvanic current through an organic substance merely by placing a sponge or other flat electrode on each side of that substance, external galvanization, cannot properly be called electrolysis (Beard and Rockwell[1] say, that when this term is "applied to any electrical operation, it is understood that electrolytic action was the leading effect sought for, and that it was obtained by needles, or at least by some form of metallic electrode more or less pointed at the extremity"), still, for the purpose of completeness, I will report a few cases of treatment of ovarian cysts by so called "external electrolysis," which is generally supposed to be entirely innocuous, but will be seen to be followed occasionally by peritonitic symptoms, as well as electro-puncture.

Cases of Ovarian Tumors treated by External Electrolysis.

(*a*) *Cure.*

Case I. Dr. Francesco Dichiara, Professor of Surgery in Palermo, Italy.[2] — *Cystovarium ; great constitutional debility. Some three hundred sittings ; reduction of tumor*

[1] *Med. and Surg. Electricity*, 1875, p. 699.

[2] *Dell' Uso della Corrente Ellettrica*, etc., Palermo, 1875.

to the size of a hen's egg. Restoration of patient to complete health.

M. R., aged 46, a nun in the convent of Santa Chiara in Palermo ; of nervous, lymphatic temperament, and feeble constitution. Seen in December, 1873. General health poor, much emaciated. An immovable, fluctuating tumor in left side of abdomen, reaching up to the umbilicus and extending to the right side. Free fluid in the abdominal cavity. Diagnosis of ovarian cyst was concurred in by Prof. Antonio Longo.

About January 1, 1874, the first electric sitting was held, the galvanic current being passed for ten minutes through the tumor, one electrode being placed on the latter, the other on the lumbar region. This first application was well borne, and after a few additional sittings, which were protracted to twenty minutes, expressed herself as feeling lighter, better able to walk, and as improving in digestion. These sittings were continued every day, excepting during the menstrual epochs, until December, 1874, being gradually prolonged to one hour's duration. The second menstrual period after the commencement of the treatment passed with much less local and constitutional trouble, diarrhea and pain, than usual. During March the ascitic fluid was diminished one half, and in May it had almost entirely disappeared. The cyst then also began to diminish and become movable ; in June this diminution in size was still more marked, and in July the tumor was reduced to two thirds of its primitive volume. At the same time the general health of the patient had improved wonderfully, her appetite was good, she slept well, began to gain flesh and strength, her menstrual period was almost painless, and the amount of blood much diminished. Towards the end of December the tumor had decreased to a mere remnant of the size of a hen's egg, and the patient was in perfect health. The number of cells and the battery used are not stated.

Case II. Dr. Frommhold, of Buda-Pesth, is reported

by Semeleder,[1] who gained his information from Benedikt's "Nervenpathologie und Therapie," 1874, to have cured an ovarian cyst by the external application of the Faradaic current. I was unable to find in the work of Benedikt referred to any mention of this case, and Frommhold's work on "Electrotherapeutics," published in 1874, was not accessible to me. The older edition of 1865, I think, contained no mention of the use of electrolysis in any shape in ovarian tumors.

CASE III. E. CUTTER, Cambridge. — Case I. under A., "Cures by Electropuncture," Miss L., perhaps belongs here; at least Dr. Cutter himself wrote me, that in his opinion the favorable result would have been obtained with the same certainty if the few electropunctures had not been made, but the treatment had been entirely external.

(*b*) *Improved.*

CASE I. DICHIARA.[2] — *Daily sittings for four weeks; great diminution in tumor and ascites. Treatment stopped on account of complicating malignant disease of uterus.*

Mrs. M. O. was first seen in 1873, when a tumor of the size of a lemon was found in the left iliac fossa, which was diagnosed as an ovarian cyst. In June, 1874, several physicians again saw the patient and found the tumor enlarged to the size of a fetal head at term. Soon an ascitic development greatly enlarged the abdomen.

September 29, 1874. Circumference of abdomen 96 centimeters. Commenced the continuous current administered as above, and continued in daily sittings of half an hour and more. Soon the ascitic fluid commenced to diminish, the tumor gradually became more easily palpable, softer, flabbier, and November 1, more than two thirds of the fluid had been absorbed; still the general condition did not improve, the emaciation increased, and it was thought

[1] *N. Y. Medical Journal*, June, 1876.

[2] Loc. cit.

that some other disease must be present. A vaginal examination revealed malignant disease of the uterus, with which that of the ovary was probably connected. Galvanic treatment was, therefore, given up.

(*c*) *Negative.*

CASE I. TH. CLEMENS, Frankfort. — *Daily sittings; currents six to twelve cells Daniell for twenty days. Then necessary to tap, tumor not decreased. At forty-eighth sitting still the same; necessary to tap again. After a walk, peritonitis. Recovering when reported.*[1]

Mrs. L., 32 years of age; tumor had been growing for eight years. Had been tapped twelve times, a large quantity of albuminous fluid having been removed each time. General health good. At the first sitting six electric shocks were sent through the tumor, then the current from six cells of Daniell's galvanic battery used, one electrode being on one, the other on the opposite side of the abdomen. At the second sitting ten cells were employed for fifteen minutes. Daily sittings were held, and the current gradually increased to twelve cells. After twenty days the fluid had increased largely in quantity, and on the thirty-sixth day it became necessary to tap. A large amount of brownish fluid was removed, which created surprise, as it has always been perfectly clear in color. On examination it was found to contain a large amount of albumen, fibrine, and abundant tissue detritus. The original hard nodules of the tumor had become soft, and the whole tumor had descended in the pelvis. Electrolysis continued daily.

After forty-eight sittings it was found necessary to tap the tumor again, and the same dark fluid was removed. One week later the patient took a long walk, was seized with fever and violent abdominal pain (peritonitis), from which she had not yet recovered.

[1] Loc. cit., *Wiener Med. Presse*, 1869.

We thus have in

Class A.	Cure	25	cases.
" B.	Permanent improvement	3	"
" C.	Temporary "	4	"
" D.	Negative result	6	"
" E.	*a.* Peritonitis, recovery	4	"
	b. Peritonitis, death	9	"

Making a total of fifty-one cases of ovarian tumors reported as having been treated by electrolysis.

Of these it appears that nineteen, or 37.25 per cent. derived no benefit whatever from the treatment, not counting the four cases in which the improvement was not permanent; in thirteen, or 25.4 per cent. decidedly injurious effects were directly produced by the electrolysis, in consequence of which nine of these, or 17.6 per cent. of the whole fifty-one, died.

Of the whole fifty-one cases, twenty-eight (giving Dr. Hayes' case the benefit of the doubt), or about 55 per cent., are reported as cured or permanently improved. In only twenty-six of the fifty-one cases is the anatomical character of the tumor mentioned, as follows: —

	Unilocular.	Multilocular.
A. Cured	5	5
B. Improved	1	2
C. Temporarily improved	–	2
D. Negative	1	3
E. Injurious *a.* Peritonitis, recovery	1	1
E. Injurious *b.* Peritonitis, death	2	4

It thus appears that of the nine fatal cases four, or nearly one half, occurred in multilocular tumors, while of the ten cases reported as cured, in which the nature of the tumor is given, five were unilocular growths, and five polycysts. It is unfortunate that the character of the tumor is not mentioned at least in the majority of the cases, for the present figures do not permit the formation of any definite

conclusions. While it does not, on the face of these incomplete returns, appear that electrolysis in multilocular tumors is more likely to entail injurious consequences than when practised on monocysts, on the other hand the latter do not seem more amenable to the electrolytic treatment, as Ultzmann from practical observation and theoretical reasoning had supposed. Were his supposition of cure by continual oozing into the peritoneal cavity through the needle punctures correct, a much larger proportion of monocysts would be reported cured, and I must in this respect concur in the opinion of Dr. Beard above quoted, an opinion shared also by Dr. Cutter who, in a private letter to me, referring to the oozing in Case II., under A. "Cured," says: "It is not desirable to force conclusions, but no such results as were obtained in this case follow mere tapping, therefore the cure could not come from the oozing. The uninsulation of the aspirator needle prevented contraction of the tissues through which it passed. The other needle being insulated gave no trouble." Besides, the cure in such cases could be only temporary, for the cyst would refill as soon as the needle punctures became closed.

In this connection it may be well to state that the battery chiefly used by Dr. Cutter is so constructed as to produce mainly a caustic, and but very slight electrolytic effect, and the question might, therefore, very properly be raised, whether the cases reported by him were really treated by electrolysis at all. Still, this is a question open for discussion, for, as above stated, Beard — certainly a competent authority in electro-therapeutics — says that electrolysis is really the least important factor in the *rationale* of so called electrolytic treatment; the great desideratum is the indirect modification of nutrition through the nerves. And why would not the electro-cautery, as applied to the tumor by means of needles thrust into its substance, be likely to influence or shock the nerves to a change of nutrition? However, so far as this paper is concerned, this question is of little importance; for only two of Dr. Cutter's cases were

cured, and one of these chiefly by the aid of external galvanization; the third was temporarily improved, and the fourth did not respond to the galvanic punctures in any way whatever.

Of course, as Beard and Rockwell say in their book (p. 739), referring to the claim that electrolysis and external galvanization have dispersed ovarian tumors, "The difficulty of diagnosing ovarian tumors diminishes not a little the value of this claim;" and the unbelievers in the method have contended that many of the cured cases were simply errors in diagnosis and no ovarian tumors at all, but merely ascites, flatulence, or adipose development. But we are certainly not justified in doubting the diagnosis of the gentlemen whose cases I have reported, many of them men of acknowledged eminence in the profession, well fitted to judge of these matters; and are therefore obliged to accept them unconditionally, and try to reconcile our *a priori* reasoning to the facts, not *vice versa*.

That a number of ovarian tumors have been entirely cured (whether permanently will always remain doubtful, so long as the patient continues to live) by electrolytic treatment is beyond question, even though we admit the uncertainty of one or the other diagnosis. The question for us to decide, it seems to me, is whether the benefits of the method sufficiently counterbalance its acknowledged and proven dangers, and the continual uncertainty of its supposed successes. Oöphoro-electrolysis was designed by its originators and advocates to supplant ovariotomy. Let us see whether its results will bear comparison with those of the latter operation.

I have shown that about 55 per cent. of the cases of electrolysis reported above were cures.

Spencer Wells reports [1] that of two hundred and ninety-six ovariotomies performed by him in the Samaritan Hospital during the last nine years, two hundred and thirty, or 77.71 per cent., recovered. Of fifty-five ovariotomies per-

[1] *British Medical Journal*, March 3, 1877.

formed in the same hospital during 1876, five, or somewhat over 9 per cent., died, leaving the enormous percentage of ninety-one recoveries.[1] The former percentage Wells trusts to increase by operating only on antiseptic principles, under which plan the first twenty-seven cases of his ninth hundred all recovered.

According to Graily Hewitt,[2] between 70 and 80 per cent. of the ovariotomies by the more experienced operators of the present day recover ; a percentage far surpassed, as just shown, by some of the recent results of Spencer Wells, Keith, and several others. When we consider that out of every one hundred patients with progressive ovarian disease, ninety are sure to die within two years, if none but palliative measures are adopted,[3] and when we take into account that ovariotomy *radically* cures the patients so far as disease of that ovary alone is concerned, while after electrolysis the danger of a relapse always hovers over patient and physician, no matter how complete the cure may apparently have been at the time the treatment was discontinued, then it seems as though we are scarcely justified in temporizing and trifling with our patient for months, when a swift, sure, and generally certain cure is at our disposal.

That the dangers of electrolysis, simple though the procedure may appear and actually is, should not be underrated, is proved by the occurrence of nine deaths in fifty-one recorded cases, a percentage of 17.6 ; larger by 8 per cent. than that of Spencer Wells in about the same number of ovariotomies.

The cases quoted in this paper show that electrolysis, when employed against ovarian tumors, may, even with all proper precautions, produce decomposition and suppuration of the cyst contents, great exhaustion and depression, peritonitis and death. I am informed on reliable authority (not

[1] Abstract in *Boston Medical and Surgical Journal*, February 24, 1877.

[2] *Dis. of Women*, 1872.

[3] Ibid., p. 638.

by the operator himself), that in one of the above cases the intestine was punctured by the electrolytic needle, and that death actually followed this accident, although after so long a period of time as to lead me to exclude the case from the class E. *b*, under which it otherwise would have belonged. Add to these data, the length of time required for a thorough trial of the electrolytic treatment, a time often so precious as not to bear wasting in case the treatment proves ineffectual; further, the diminished chance of success from ovariotomy, when the patient's strength has been allowed to depreciate during the vain electric course, and when, perchance, adhesions have formed about the numerous needle-punctures (as occurred in four of the cases reported); and finally, the unavoidable, constant uncertainty of the permanence of the cure, so long as the least remnant of the diseased ovary remains, and the distrust with which many of our leading Gynecologists have begun to look on the method is scarcely to be wondered at. We thus find not only men who, like Semeleder, Skene, Fliess, and Ross, have been so unfortunate as to lose patients by it, but others, who have had favorable results, like Cutter and Macdonnell, sharing this distrust.

Dr. Cutter writes me: "There is danger in this operation;" and attributes the deaths which have occurred to the use of uninsulated needles. He states his intention of continuing his observations with external galvanization. This remark applies entirely to ovarian tumors, not to uterine fibroids, in which the pathological conditions are totally different, and where greater risks are allowable to secure proportionate results.

Dr. R. W. Macdonnell, of Montreal, who has had one successful case, writes under date of April 30, 1877, to Dr. Cutter (to whose kindness I owe these extracts): "I think it would be a risk to allow the patient to use the battery for more than ten minutes, as the evolution of the gases might distend and perhaps burst a thin cyst, and then the escaped fluid would cause peritonitis. In an experiment I

made upon an ox-bladder almost filled with an imitation of ovarian fluid (*i. e.*, whites of twenty eggs, salt and warm water), after electricity was employed for fifteen minutes, the upper part of the bladder became much distended with the gases, and tympanitic. We saw the gases ascending on both needles, and the coagulation of the albumen also. On opening the bladder the albumen presented the appearance of the white of a boiled egg.

"In one of the cases in the hospital the upper part of the tumor became increased and tympanitic the day after electrolysis was employed.

"We must proceed cautiously, for I confess my first ideas of the harmless nature of the process have been sadly shaken by the results of Semeleder's cases, as well as the results in the hospital."

Again, in a later letter to Dr. Cutter: "The details have to be worked out yet. I shall, I think, dispense with needles, and apply the electricity over two large surfaces with sponges externally. It may take a longer time, but it will be free from danger. I intend using two or three separate batteries at the same time, so as to cover the tumor with five or six sponges, all working at the same time."

Finally, in a letter to me, dated May 3, 1877, Dr. Macdonnell says: "Electrolysis is not the simple thing that Semeleder's first papers would lead one to suppose. There is a great deal about it to which he does not even allude. In future I shall not use needles, and will confine the treatment to the application of wet sponges."

While on the point of summing up the evidence above collected, and drawing whatever conclusions the facts would appear to warrant, I received the following letter from Dr. Von Ehrenstein, in answer to a final request from me for figures and positive statements. I give it *verbatim*, as I think its interest and importance demands: —

VIENNA, *May* 7, 1877.

DR. PAUL F. MUNDÉ, *New York:* —

My dear Colleague, — Your esteemed favor has only just reached me here, where I am spending a few weeks for the restoration of my health. First let me thank you for your sympathy with my physical condition. I hope to return to Dresden by the middle of this month and to be able to resume practice during the coming summer. It is impossible for me to answer your questions otherwise at present, in the absence of my notes, than from memory and consequently only approximately, but what I have to communicate may be briefly summed up as follows: The sum total of all female abdominal tumors treated by me with electricity, but not always by electrolysis only, amounts to four hundred and fifty-six; of these about three hundred were cases of ovarian dropsy, two hundred and twenty of which being tumors with liquid contents, and of these all were cured, with the single exception only, of one patient who left before the completion of the treatment. In some of these cured cases, say, in thirty or forty, after two to five years the tumors returned, but were invariably removed again when the treatment was administered in my establishment; one case of return, on the other hand, treated by a North-German physician with electrolysis only, without regard to my method, terminated fatally under his care.

Twice I have been gratified by the intelligence that patients who had been permanently cured of ovarian tumors by me had borne children two or three years later, which were stronger than those of which they had been previously delivered.

Of the other cases those particularly took a less favorable course which had previously been frequently tapped, or in which solid masses projected like islands into the liquid contents. In this connection I will mention a cystosarcoma, the owner of which while under my treatment died of an accidentally acquired intercurrent pneumonia. The sarcoma was found at the autopsy to weigh fully thirty kilo-

grammes (sixty pounds). Besides, a large number of cases of easily recognizable carcinoma of the ovary and other abdominal organs, and others in which the malignancy of the affection was not discovered until the autopsy, presented themselves for treatment, all of which terminated fatally in spite of the electric treatment, although even then the pain and dimensions were diminished thereby ; in general, however, the electricity appeared rather to hasten the end, although no trace of suppuration or other traumatic inflammation ever followed the therapeutic measures or was visible at the autopsy.

In conclusion, I particularly desire to caution the profession against the decidedly false imitation of my method, according to which several German physicians introduce both poles armed with needles into the tumor at once, while I principially insert only the cathode or positive pole, and am especially careful to prevent any absorptive fever by blood-purifying remedies particularly the sulphite of magnesium or magnesia sulphurosa (not the sulphate of magnesia).

I shall be happy to be of service to you with further information should you desire it, and request, in case you publish any of these notes, that a copy be sent me to Dresden.

Yours very respectfully,

Dr. Med. Von Ehrenstein.

At first sight it would appear, as indeed it did to me, that this letter completely changes the figures and statistics collected and reported by me in this paper, making the preponderance of successes (say two hundred and twenty, at least) so great as to throw the paltry few unfavorable results (nine) entirely into the shade. But a moment's reflection will show that this is not the case. My paper is based entirely on the individual cases and the special methods which have either already been published or were directly communicated to me by their authors. All these cases are enumerated with more or less detail, and in each

the manner of application of the electrolytic method is distinctly stated. On these only, therefore, can I base my conclusions, and so long as Dr. Von Ehrenstein does not favor us with a detailed account of his method in all its intricacies, and with positive and complete figures and histories of his cases, so long will it be impossible to give his method the credit to which I trust it is justly entitled, or make his cases available for statistical research.

I therefore believe myself fully justified in adhering to the conclusions which the facts developed in this paper appear to warrant me in drawing, as follows: —

1. Unquestionably a number of cases of ovarian tumors, reported on reliable authority, have been completely cured or permanently improved by electrolysis ; out of fifty-one cases twenty-eight, or about fifty-five per cent. If only one case were cured by this treatment, it would suffice to establish the possibility of such a cure ; that principle is therefore secured.

2. It is equally unquestionable, however, that in a number of cases the electrolysis was followed by dangerous (thirteen, or 25.4 per cent.) and even fatal results (nine of these thirteen, or 17.6 per cent. of the whole fifty-one).

3. Further, six cases out of fifty-one received neither benefit nor injury from the treatment, and four were only temporarily improved ; total ten, or 19.6 per cent.

We thus have a total of twenty-three cases, or forty-five per cent. in which the electrolytic treatment failed to accomplish the object for which it was administered.

4. The lack of accurate reports of the anatomical character of the cyst in the cases collected prevents any definite conclusion as to whether monocysts or polycysts are more or less amenable to electrolysis or unfavorably affected by it. It would seem, however, that the tumors most likely to be benefited by electrolysis are small monocysts, and polycysts with thin walls and fluid contents, and absence of large, solid masses.

5. How the cures were effected is a matter still open to

investigation, probably by some occult, as yet unexplained, influence on the secreting and absorbing powers of the nerves and vessels supplying the cyst walls ; certainly not, as a rule, however, by the oozing into the peritoneal cavity of the cyst contents through the galvanic needle punctures.

6. Notwithstanding these undoubted cures, the percentage of successes of oöphoro-electrolysis (55 per cent.) compares unfavorably with that of ovariotomy (70 to 80 per cent. ; Spencer Wells 78 per cent., in 1876 as high as 91 per cent.) ; and so also do the deaths by electrolysis (17.6 per cent.), nearly equal those following ovariotomy in recent years (20 to 30 per cent. ; 22 per cent.) and far exceed those occurring in the last series of fifty-five cases of Spencer Wells (five, or 9 per cent.).

This unfavorable proportion is intensified by the length, and often loss, of time involved in the electrolytic course, by the consequent increased debility of the patient and the diminished chance of success for ovariotomy when more or less extensive adhesions have been produced by the needle punctures, and finally, by the uncertainty as to the permanence of the cure after electrolysis, a doubt naturally inadmissible after the radical operation.

7. Judging partly from these statistics, and partly from general considerations, it would seem that electrolysis can in no wise supplant ovariotomy, and that the cases in which it would appear justifiable to subject the patients to the tedious and protracted course of galvano-puncture usually indispensable to the attainment of any results, good or evil, narrow themselves down to two classes: 1, Small monocysts in which the discomforts are so slight as to render the more serious radical operation as yet uncalled for, and in which it seems fair to give the patient a — in such tumors — probably innocuous chance of a cure by milder means ; and 2, particularly, large unilocular or multilocular tumors, in which the presence of extensive adhesions, especially in the pelvis, renders ovariotomy impracticable, and in which and palliative procedure is desirable and admissible, so long as

it affords the patient a hope of relief and temporary prolongation of life.

To try electrical experiments with patients whose tumors and constitutions are in every way prepared for the radical operation looks very much like trifling with their lives.

8. While this is the verdict forced upon us by experience, as regards electrolysis proper, there is one method of electrical treatment which, at least, is almost innocuous, and may therefore be employed if the condition of the patient permits the delay. This is external galvanization or Faradization, by both of which methods cures of ovarian tumors are reported by reliable authorities. The mixed treatment by electrolysis and external electrization has been followed by some operators as more safe than the former alone, and more efficacious than the latter, and by it, I believe, the majority of cures claimed by Von Ehrenstein were obtained.

9. In conclusion, I feel it my duty to say that, in spite of the above figures and deductions, correct though they be, I do not feel justified in positively considering this question decided adversely, so long as the marvelous results claimed by Von Ehrenstein are not disproved or shown to be fallacious. In simple justice to himself, to his method, and to suffering humanity, Ehrenstein should without delay publish, not only the details of his method, but also histories of all his cases, and this I hope to induce him to do before the close of the present year.

NOTE. Notwithstanding my earnest appeal, not a word has been heard from Dr. Von Ehrenstein up to date of going to press, March 15, 1878. Can it be, as I am informed by excellent authority in Germany, that he is a visionary and his successes all delusion? I leave the profession to judge for themselves. P. F. M.